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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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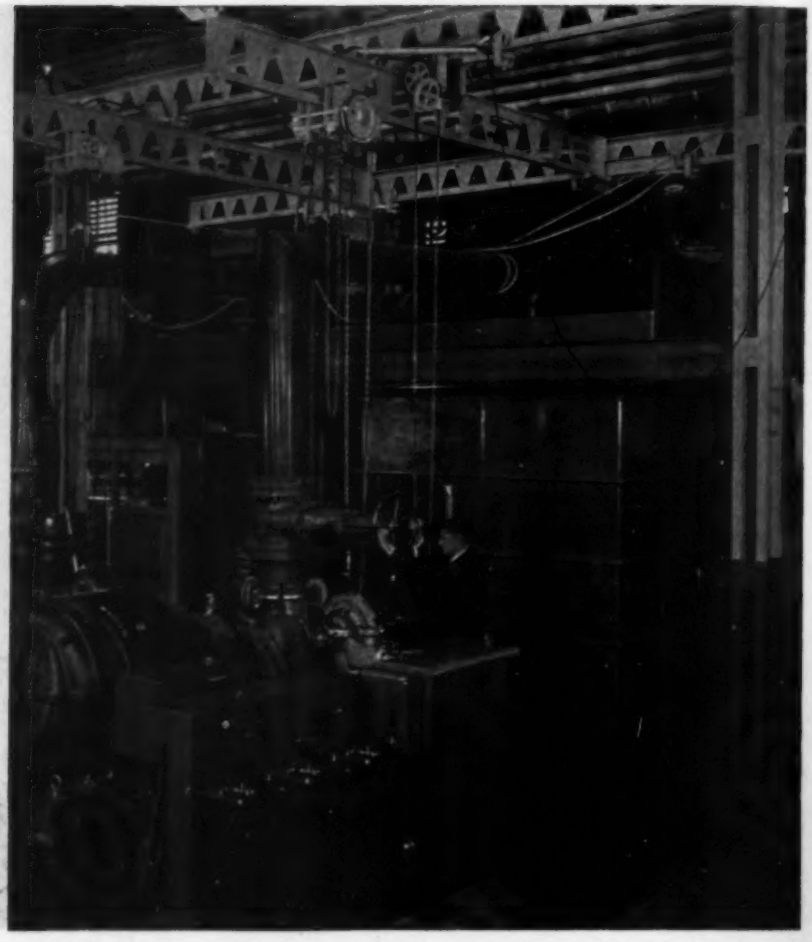

Modern vocational schools teach future shopmen how this new painting system improves production and housekeeping!

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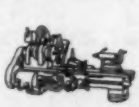
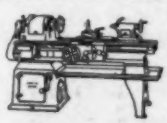

☐ 9" and 10" BENCH LATHES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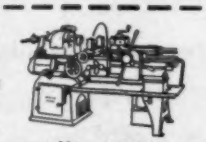
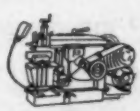

☐ ½" and 1" Collet TURRET LATHES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Vol. 40 No. 8

OCTOBER, 1951

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Published on the 15th of month preceding date of issue

THE BRUCE PUBLISHING COMPANY,
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★ ★ ★ ★

This Month's Cover

The picture on the October cover of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine shows the salesroom of the Distributive Education Department of the Tucson High School, Tucson, Ariz.

The students who take the distributive education course have the opportunity of practicing their salesmanship under the direction of their instructor, Chester Sheaffer.

The photograph of the picture used on the October cover was taken by Mike Perez, a student of the Graphic Arts Department of the Tucson High School, Tucson, Ariz.; Harry A. Goldstein, instructor.

★ ★ ★ ★

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Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

TABLE OF CONTENTS

Industrial Arts in the Elementary School.....*Claude E. Nihart* 303
Preparation and Upgrading of Industrial-Education Personnel...*Einer E. Siro* 305
School Shop Planning With Three-Dimensional Models...*John Austin Woolley* 310
Are You Using Your Bulletin Board?.....*John J. Defourney* 311
Leaders in Industrial Education.....*William T. Bawden* 312
The Job of Teaching.....*Homer C. Rose* 315
Editorials 316
The Next Twenty Years in Industrial Arts.....*Ward L. Myers* 317

PROBLEMS AND PROJECTS

A Practical 10 Volt Supply Outlet.....*Charles W. Carlock* 319
Combination Paperweight and Paper Spindle.....*B. Alfred Cox* 320
Continuity Tester.....*John V. Adams* 321
It Is Easy to Recognize Graphic Arts Processes.....*R. Randolph Karch* 323
Welded Candleholders.....*R. J. Coleharp* 323
Make-Up Kit.....*W. A. Lerner* 324
A Practical Problem for the Drafting and Mathematics Classes..... *Andrew G. Lofgren* and *David E. Rosengard* 325
Fly-Tying Vise.....*Roman Tomkiewicz* 327
Fly-Tying Vise.....*Roman Tomkiewicz* 328
Aluminum Jewel Box.....*Douglas Cox* 328
Modern Lamp.....*Berry E. Morton* 330
Plastic Book Ends.....*Jay A. Borden* 331
Holder for Model Tool Bits.....*Shelby S. Shake* 331
Kitchen Step Stool.....*Marvin E. Johnson* 333
Eccentric Boring Head for Milling Machine.....*U. D. Walker* 334
Wrinkle Finishes for the General Shop.....*M. D. Roberts* 336
A Portable Demonstration Unit.....*Thomas H. Schanck* 337
Carousel Pipe Rack.....*F. C. Tompkins* 337
Better Shop Teaching When Shop Film "Know Your Hand Tools" Is Used *Everett M. Brown* 338
Designing an Industrial Arts Award.....*Iva H. Johnson* 340
Early Problems of New Industrial-Arts Teachers.....*John A. Carey* 341
Portable Bar and C-Clamp Rack.....*Melvin Ham* 341
E-Z Made Crystal Radio Receiver.....*Harry J. Miller* 342
Rayon Flock for the General Shop.....*M. D. Roberts* 343
Cast Cement Plant Holder.....*Roy A. Radtke* and *Walter Wutke* 345

Association News..... 4A
Personal News..... 28A
Questions and Answers..... 36A
News Notes..... 36A
New Publications..... 44A
Shop Equipment News..... 48A

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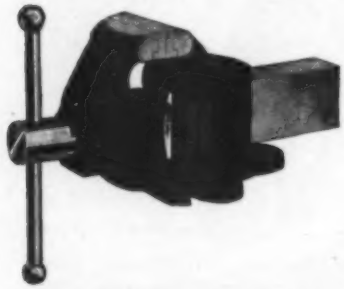

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ASSOCIATION NEWS

COMING CONVENTIONS

Oct. 8–11. Future Farmers of America, at Municipal Auditorium, Kansas City, Mo. Secretary: A. W. Tenney, Office of Education, Federal Security Agency, Washington, D. C.

Oct. 8–12. National Safety Council, at Stevens Hotel, Chicago. Secretary: R. L. Forney, 425 N. Michigan Ave., Chicago.

Oct. 22–25. The Adult Education Association of the U.S.A., at Alexandria Hotel, Los Angeles, Calif. Administrative Secretary: Robertson Sillars, 167 Public Square, Cleveland.

Oct. 25. Indiana Vocational Association, at Arsenal Tech. Stuart Hall, Indianapolis. Secretary: Glen Barkes, 802 E. Market St., New Albany, Ind.

Oct. 26. New Mexico Vocational Association, at Albuquerque. Secretary: L. C. Dalton, State Supervisor of Agricultural Education, Box 98, State College, N. Mex.

Oct. 26–27. Four-State Industrial Arts and Vocational Education Conference, at Kansas State Teachers College, Pittsburg. Secretary: J. V. Melton, Kansas State Teachers College, Pittsburg, Kans.

Nov. 1–3. Wisconsin Industrial Arts Association, at Milwaukee, Wis. Secretary: Harlan Shufelt, City Hall, Racine, Wis.

Nov. 8–10. Industrial Arts Conference at La Salle Hotel, Chicago. Chairman: Dr. Verne C. Fryklund, President, The Stout Institute, Menomonie, Wis.

Nov. 26–Dec. 1. National Association of Industrial Teacher Trainers, at Curtis Hotel, Minneapolis, Minn. Secretary: W. M. Bateson, Room 4200C, University High School, Ann Arbor, Mich.

Nov. 26–Dec. 1. Minnesota Vocational Association, at Minneapolis. Secretary: R. Fausch, Minn. Vocational School, Minneapolis, Minn.

Nov. 27–30. American Vocational Association, at Minneapolis, Minn. Secretary: Dr. M. Mobley, 1010 Vermont Ave., N.W., Washington, D. C.

OSWEGO EPSILON PI TAU INITIATES

For the first time in the history of Epsilon Pi Tau, at State University of New York, Teachers College at Oswego, graduate students were admitted into the organization. During the afternoon of August 7, 1951, 14 new members were formally initiated at the College. During the evening a formal banquet was held in the DuBois Hotel at Minetto, N. Y., for these new members.

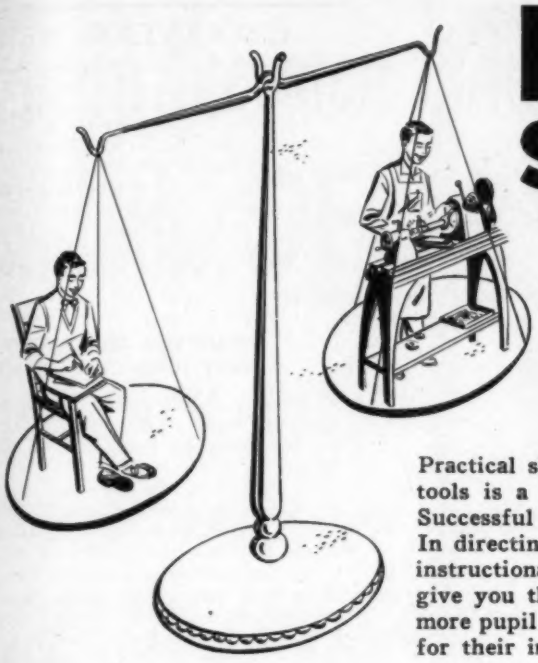
Guest speaker for the evening, Dr. Robert Carey, director of Bureau of Guidance of Yonkers, N. Y., also was initiated into membership. Other new members include: George D. Anderson, Herkimer, N. Y.; James Barnard, Belleville, N. Y.; Edgar Bockes, Warrensburgh, N. Y.; Robert Chetney, Newark, N. Y.; Fred Culpepper, Williamsburg, Va.; John Gillard, Pulaski, Va.; Walter Griggs, Blacksburg, Va.; Robert McWilliams, Oswego, N. Y.; Peter Rider, Highland.

(Continued on page 6A)

Oswego Epsilon Pi Tau Initiates

(Front row, left to right): Peter Rider, Vernon Seeley, Jack Salton, Karl Wright, Fred Culpepper, and Robert McWilliams.

(Back row, left to right): Dr. Robert Carey, John Gillard, Edgar Bockes, Ralph Rogers, James Barnard, Robert Chetney, Walter Griggs, and George Anderson.



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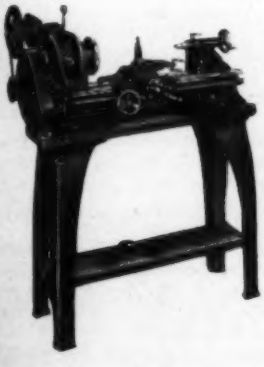
Practical skill, combined with sound theory, on *all* the basic shop tools is a fundamental precept for modern vocational education. Successful students need to know the "how" as well as the "why." In directing your program toward such a goal there are no better instructional helps than Atlas metalworking tools. Atlas tools give you the most for your tool budget — more tools per dollar, more pupil stations, more good skill training to equip your students for their important start in life.



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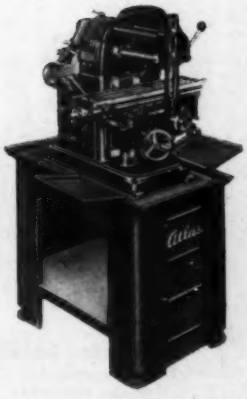

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ASSOCIATION NEWS

(Continued from page 4A)

N. Y.; Ralph Rogers, Pleasantville, N. Y.; Jack Salton, Walton, N. Y.; Vernon Seeley, Livingston, N. Y.; and Karl Wright, Farmingdale, L. I., N. Y.

Toastmaster for the evening was Charles Coward of Eastport, Long Island, N. Y. Guests included: President and Mrs. Harvey M. Rice; Dr. and Mrs. Thomas R. Miller; Dr. William Huss; Dr. C. Robert Hutchcroft; and John Storm.

INDUSTRIAL EDUCATORS SUPERVISORY CONFERENCE

The third annual meeting of the Industrial Educators' Supervisory Conference was held at Bradley University, Peoria, Ill., on August 9, 10, and 11, 1951.

All meetings of the conference were held in the Packard Room of the Bradley Library.

H. J. Shufelt of Racine, Wis., was chairman of the conference and presided at all meetings.

The first meeting was held at 9:00 a.m. on Thursday, August 9. The subject discussed was "Our Schools and the Emergency Training Program." Edward M. Claude, chief of trades and industries, State Board for Vocational Education, Springfield, Ill., presented a paper on the subject that was taken from the report of Dr. Raymond Gregory, assistant commissioner, U. S. Office of Education. He said in substance that up to the present the school has not been generally called upon to train workers for defense plants because the de' nse production act has as yet not been passed.

L. L. Josserand, director of T. & I. at Bloomington, Ill., and L. W. Prakken, editor, School Shop, Ann Arbor, Mich., assisted Mr. Claude in developing the subject.

A general discussion followed.

At the Thursday afternoon session Glenn Fletcher, director of industrial education, Houston, Tex., assisted by Lee Barnett, Fred Swan, and others, spoke on "The Implementation of Industrial Programs."

The points brought out were: industrial-arts programs should be planned for all elementary and high school grades. The industrial-arts program should fit in with the academic subjects. The last two years of high school should, if possible, be of the vocational-industrial type.

Then the work of the supervisor was discussed, and such questions as improvement of teachers, their rating, ordering of equipment and material, the writing of course outlines and instructional material, budgeting, teacher in-service training, summer school attendance and summer workshops, were proposed and generally discussed.

For Thursday evening McKnight and McKnight, publishers, invited all conference members to an excellent chicken dinner and a trip through the McKnight plant.

Friday morning, Arthur L. Reagh, retiring director of industrial arts and vocational education, Grand Rapids, Mich., discussed "The Industrial Education Curriculum."

He stated that industrial leaders want their help to have a good general education. Only for some workers definite skills are demanded and vocational education can train for these positions.

Industrial-arts courses should emphasize safety, co-operation, knowledge of how to work under

(Continued on page 8A)

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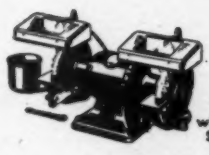

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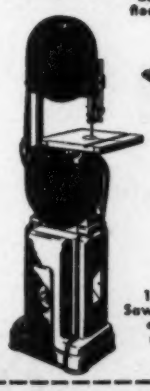

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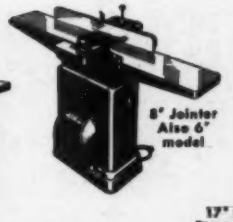

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ASSOCIATION NEWS

(Continued from page 6A)

directions, and something about employee and employer relations.

At the Friday afternoon session, Dr. Wayne P. Hughes of the National Safety Council, discussed "The Responsibility of Industrial Supervisors for the Safety in Our Schools."

Shop teachers should provide a safe environment for their students. State safety engineers and safety engineers from industrial plants will gladly assist teachers to solve their safety problems. "I haven't had an accident in my shop for ten years" may be a statement from a teacher who is very much interested in safety, or from one who merely has been lucky.

Where supervisor and teacher are interested in safety and eye protection you will have good safe shops. The most serious hazard is when the shop teacher leaves his shop while his students are running the machines.

At 4:00 p.m. Friday the Graduate Industrial Education Club of Bennett College and the members of the Industrial Educators' Supervisory Conference attended a mixer in the Wycoff Room, Bradley Library, and after dinner at the University cafeteria joined in an interesting powwow on industrial arts and vocational education affairs.

On Saturday morning, William A. Bakamis, graduate student at Bradley University, on leave from Washington State College, Pullman, Wash., spoke on "The Supervisor as a Person and Educator."

He stated that supervisors should work with their teachers for the improvement of shop subjects and courses but they should not forget the student. They should give the teacher a clear picture of what he is to be supervised on, how he is to be rated, etc., and they should continually work with him in a democratic way on how he can improve himself and the subject which he teaches.

At the business meeting, Glenn Fletcher, director of industrial education, Houston, Tex., was elected chairman for next year's conference. Dr. Fred Strickler will continue as executive secretary.

The meeting for the next conference will be on August 7, 8, and 9, 1952, at Bradley University, Peoria, Ill.

ANNUAL BANQUET, ALPHA CHAPTER EPSILON PI TAU

The twenty-second annual banquet, initiation, and forum of Alpha Chapter of Epsilon Pi Tau was held at the Faculty Club, at the Ohio State University on July 28, 1951.

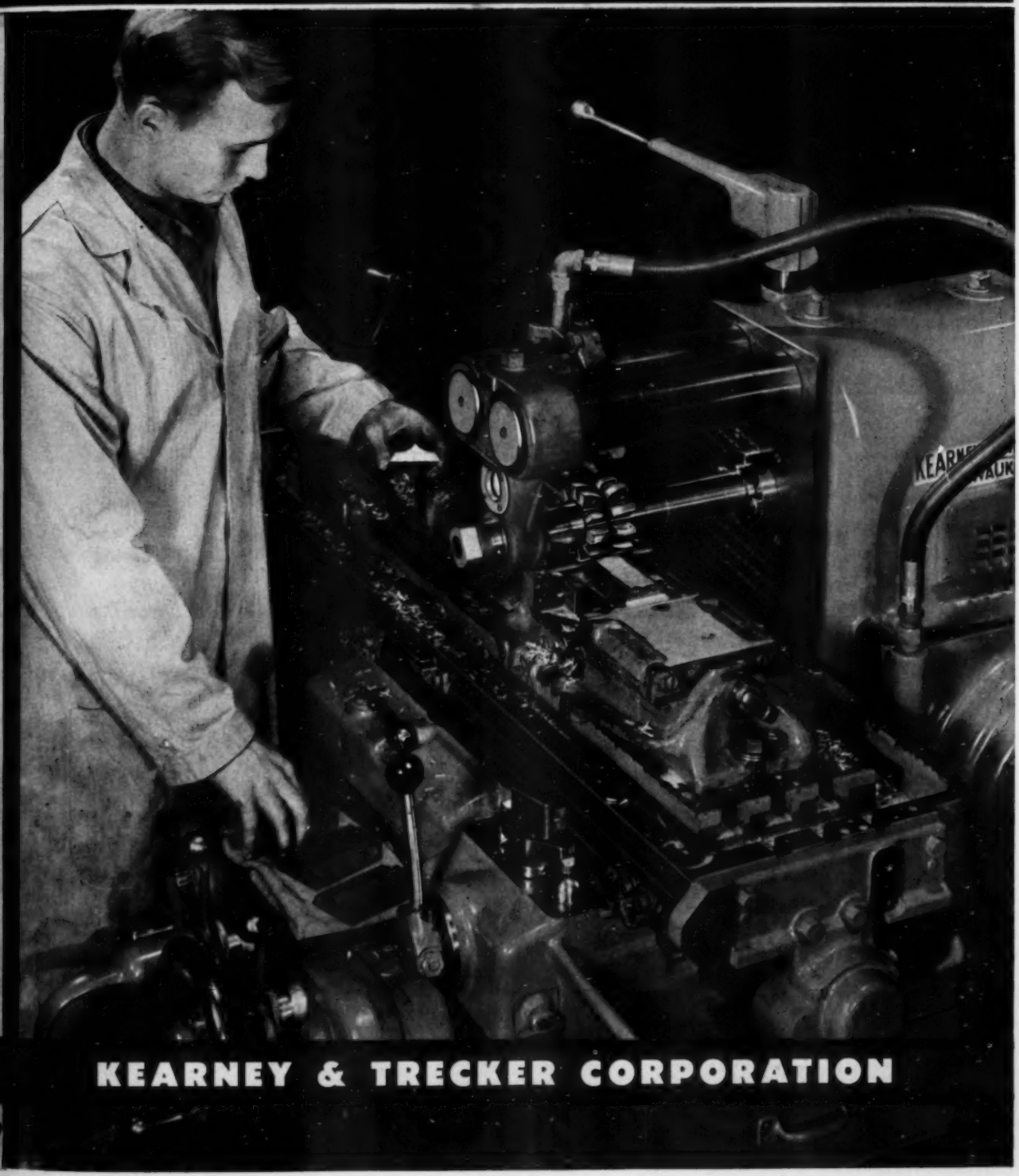
The initiation team consisted of: William A. Mays, Alabama Polytechnic Institute, Auburn, Ala.; Dwight W. Nichols, State College, San Francisco, Calif.; Leslie Douglas, Boys Trade School, Columbus, Ohio; Ralph E. Stucki, Louisiana State University, Baton Rouge, La.; Tod H. Herring, Maine Township High School, Des Plaines, Ill.; Fred J. Hoffman, Boys Trade School, Columbus, Ohio; Robert D. Mehl, High School, Needles, Calif.; Vincent J. Waryha, High School, Malone, N. Y.; William E. Warner, founder of the fraternity.

The following were initiated into the chapter: Joseph J. Campisi, Youngstown, Ohio; Jack De Pietro, Columbus, Ohio; George L. Dragon,

(Continued on page 28A)

KEARNEY & TRECKER MILWAUKEE

Announces 6 new **MODERN MILLING MACHINES THAT MEET MODERN INDUSTRIAL STANDARDS FOR VOCATIONAL TRAINING**



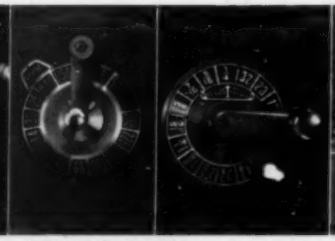
KEARNEY & TRECKER CORPORATION

Six New Machines — Seven Practical Features ...that industry is buying now!

Kearney & Trecker's new Nos. 1CH, 2CHL and 2CH milling machines have every performance-proven operating and construction feature needed for modern short-run or production milling requirements.

New, heavier columns scientifically designed to absorb vibration from heavy cutting loads give greater rigidity.

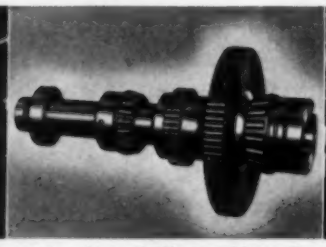
Rapid-set dials, vapor blasted, have high visibility — avoid costly setting errors . . . give positive lock every time.



Wider feed and speed ranges to meet modern cutting tool requirements—optional ranges available at extra cost.

Extra large diameter table feed screw and extra long bronze nut equipped with backlash eliminator.

Positive, metered pressure lubrication to saddle, table and kneeways and table feed assembly assure greater machine life.



3-bearing spindle provides solid support for greater rigidity and cutting efficiency using modern cutting tools.

Mono-Lever Control and Automatic Table Cycle (optional) help teach high production milling practices.

The principal specifications below, point up the larger working ranges of these new Kearney & Trecker milling machines. They are *exactly the same machines* that plants everywhere — large and small — are buying right now to meet today's and tomorrow's tool room and production needs. Give your students the real "know-how" of modern milling practice. These new machines in your school shop will make a big difference in fitting your students for their future in industry.

Machine	TABLE				SPINDLE	
	Working Surface	Power Feed Travel	Feeds Number & Range	Power Rapid Traverse — " Per Min.	Nat'l Std. Taper	Speeds — Number and Range
3hp No. 1 MODEL CH Plain and Universal	40" x 10½"	Long. 22" Cross 8"	16—½" to 32"	150"	40	16 — 25 to 1500 RPM
		Vert. 17"	16—¼" to 16"	75"		
3hp No. 2 MODEL CHL Plain and Universal	46" x 10½"	Long. 28" Cross 10"	16—½" to 32"	150"	40	16 — 25 to 1500 RPM
		Vert. 17"	16—¼" to 16"	75"		
5hp No. 2 MODEL CH Plain and Universal	50" x 12"	Long. 28" Cross 10"	16—¼" to 32"	150" Plain 100" Univ.	50	16 — 25 to 1500 RPM
		Vert. 18"	16—⅛" to 16"	75" Plain 50" Univ.		

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Get complete specifications on any of these machines today. Contact your nearest Kearney & Trecker representative or write factory direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

3 SIZES 2 STYLES

New 3hp No. 2
Model CHL Plain

New 5hp No. 2
Model CH Universal

EDUCATIONAL AIDS

See back page for list and detailed description of visual training and other aids available for your classes and students.

Here are a Few of the Schools Now Using Kearney & Trecker Milwaukee Milling Machines for Vocational Training

CALIFORNIA
Alhambra City School District — Alhambra
University of California — Berkeley
Compton Union High School — Compton
University of California — Davis
Fullerton Union High School — Fullerton
Whittier Union High School — Los Angeles
Board of Education — San Francisco
Santa Ana High School — Santa Ana

COLORADO
School District No. 20 — Pueblo

CONNECTICUT
State Trade School - Stamford

ILLINOIS
State Teachers College — Charleston
University of Chicago
Englewood High School
Washburne App. School — Chicago
Joliet Township High School — Joliet
Moline Board of Education — Moline
Bradley Polytechnic Institute — Peoria
Rockford Senior High School — Rockford
Sterling Tp. High School — Sterling
University of Illinois - Urbana

INDIANA
Alex. Jr.-Sr. High School — Alexandria
Washington High School — East Chicago
Arsenal Tech. High School — Indianapolis
Purdue University - Lafayette
Vocational Education Dept. — South Bend
Gerstmeyer Tech. High School — Terre Haute
Indiana State Normal

IOWA
Iowa State College - Ames
Davenport Public Schools — Davenport

KANSAS
Labette Co. Com. High School — Altamont
Kansas State Agric. College — Manhattan
Topeka Public Schools — Topeka
Wichita High School — Wichita

KENTUCKY
Theo. Ahrens Trade School — Louisville

MASSACHUSETTS
Beverly High School - Beverly
Brookline Manual Training — Brookline
Mass. Institute of Technology — Cambridge
East Boston High School — East Boston
Holyoke High School — Holyoke
Hyde Park High School — Hyde Park
Lawrence Industrial School — Lawrence
Medford Vocational School — Medford
Vocational School — New Bedford

MICHIGAN
University of Michigan — Ann Arbor
Dearborn High School
Fordson School
Henry Ford Trade School
Lowrie Jr. High School — Dearborn
Salena Jr. High School — East Dearborn
Cass Technical High School
Chadsey High School
Bishop School
Edwin Denby High School
Wright School
Redford High School — Detroit
G-M Institute of Technology — Flint
Ottawa Hills School
Harrison Park School
Union High School — Grand Rapids
Copernicus Jr. High School
Hamtramck Voca. School — Hamtramck
Jackson High School — Jackson
Central High School
Western State Teachers Col. — Kalamazoo
Boys Vocational School — Lansing
Michigan State College — East Lansing
Wilson School - Muskegon

MINNESOTA
School District No. 12 - Ely

MISSOURI
Manual High & Voca. High — Kansas City
Cleveland High School — St. Louis

NEW HAMPSHIRE
N. H. College of Agriculture
University of New Hampshire — Durham
West Side High School — Manchester

NEW JERSEY
Boys Vocational School — Bloomfield
Central High School — Trenton
Rutgers University — New Brunswick

NEW YORK
New Technical High School — Auburn
Union Free School District — Batavia
North Senior High School — Binghamton
Peckham Vocational School
McKinley Vocational School — Buffalo
Vocational School No. 10 — Dunkirk
Board of Education — Hastings upon Hudson
State Agricultural School — Industry
Jamaica Continuation School — Jamaica, L.I.
Newton High School — Long Island City
Masena High School - Masena
Textile High School
Queens College
Auburn High School
Bronx Vocational School
Franklin K. Lane High School — New York
Geo. Hall Trade School — Ogdensburg
University of Rochester
Rochester Shop School — Rochester
Saranac Lake Public School — Saranac Lake
Staten Island Voca. School — Staten Island
Continuation School — Syracuse

LOUISIANA
Sullivan Mem. Trade School — New Orleans

NORTH CAROLINA
University of N. C. — Chapel Hill
Duke University - Durham

OHIO
Timken Foundation of Canton — Canton
East Technical High School
West Technical High School
Collinwood High School
Case School of App. Science — Cleveland
Cuyahoga Heights School — Cuyahoga
Perkins Observatory — Delaware
Washington High School — Massillon
Toledo Vocational School
Woodward High School
Waite High School - Toledo

OKLAHOMA
University of Oklahoma — Norman
Board of Education — Ponca City
Daniel Webster High School
New High School - Tulsa

OREGON
Jefferson High School — Portland

PENNSYLVANIA
Allentown High School — Allentown
Lower Merion High School — Ardmore
Bethlehem Trade School
Liberty High School — Bethlehem
State Teachers College — California
Vocational Machine Shop — Clairton
Erie East Tech. High School — Erie
Ridley Township High School — Folsom
Franklin High School — Franklin
McCaskey High School — Lancaster
Benj. Franklin Jr. H. School
New Castle Trade School — New Castle
New Kensington High School
Arnold Public School — New Kensington
Bok Vocational School
Dobbins Vocational School
Girard College — Philadelphia
Hill School - - Pottstown
Reading High School — Reading
Pennsylvania State College — State College
G.A.R. High School
E. L. Meyers High School — Wilkes-Barre
Wilmerding School District — Wilmerding

TENNESSEE
Crocket Tech. High School — Memphis

VIRGINIA
John Marshall High School — Richmond

WEST VIRGINIA
Stonewall Jackson High School — Charleston
Huntington High School — Huntington
West Virginia University — Morgantown

WASHINGTON
Seattle-Edison Voca. School — Seattle

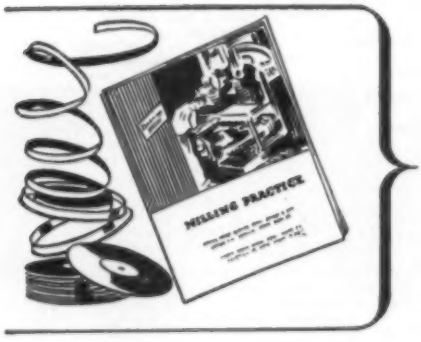
WISCONSIN
Beloit Vocational School — Beloit
Fond du Lac Public Schools — Fond du Lac
Green Bay Vocational School — Green Bay
Janesville Vocational School — Janesville
Kaukauna Vocational School — Kaukauna
Kenosha Vocational School — Kenosha
West High School
Madison Vocational School — Madison
Marinette Vocational School — Marinette
Boys Technical High School
Milwaukee Vocational School — Milwaukee
Neenah Senior High School — Neenah
Sheboygan Vocational School — Sheboygan
Two Rivers School of Vocational and Adult Education — Two Rivers
Wausau Vocational School — Wausau
West Allis Public Schools
West Allis Vocational School — West Allis
Yerkes Observatory
(University of Chicago) — Williams Bay
Wis. Rapids Public Schools — Wisconsin Rapids

ONTARIO
Central Technical School — Toronto
Windsor-Walkerville Technical School - - Windsor

QUEBEC
Montreal Technical School — Montreal
Quebec Technical School
University of Puerto Rico — Quebec

PUERTO RICO
University of Puerto Rico — Rio Piedras

Aids for Machine Shop Instruction on Milling Machines and Milling Practice



FILM COURSE Kearney & Trecker will loan you, without charge, this complete sound slide, five-part training film (in color) dealing with good machine tool practice, with special emphasis upon the purpose and use of milling machines. Complete with instructor's guide.*

ELEMENTARY HANDBOOKS Kearney & Trecker's MILLING PRACTICE SERIES of booklets are highly popular with educators, students, and machine operators alike. Book I stresses the "Right and Wrong in Milling Practice". Prepared in cartoon style, this book discusses various aspects of milling machine operation including job setup, taking the cut, selection and care of cutters, general housekeeping and safety precautions. For dramatizing the lesson to be learned, this guide book has won widespread approval.

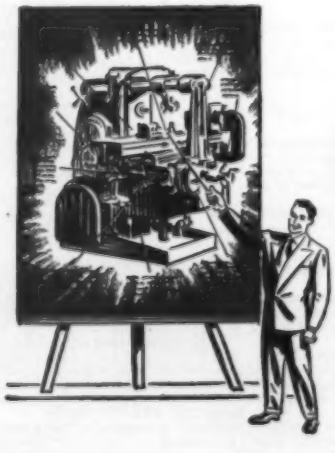
Book II of the MILLING PRACTICE SERIES, "The Milling Machine and Its Attachments", provides information which will enable an understanding of the principles of modern milling machine design and construction. As a complement to this discussion, the subjects of attachments, cutters and accessories also are included.

The nominal charge of 50¢ for Book I, and 25¢ each for Books II and III, ($1.00 per set) is many times repaid by their educational value. The cost is the same for single copies or quantity orders. When entire class groups desire copies, it is best to order at one time through one check, money order or purchase order. The remittance should be made out to Kearney & Trecker Corporation, Milwaukee 14, Wisconsin.**

DESCRIPTIVE LITERATURE Kearney & Trecker will send free for library, classroom or shop use a set of catalogs describing the various machines it manufactures. This literature is profusely illustrated with photographs and drawings which help in the study of nomenclature related to milling machines, their attachments and accessories, and in the application of such equipment.*

Each set includes:

Catalog No. CSM-20	Knee Type Milling Machines
Catalog No. B-20	Bed Type Milling Machines
Catalog No. D-20	Rotary Head Milling Machine
Catalog No. C-11	Face Milling Cutters and Their Use
Catalog No. WA-12	Universal Dividing Head
Catalog No. CA-20	Milling Machine Attachments & Accessories

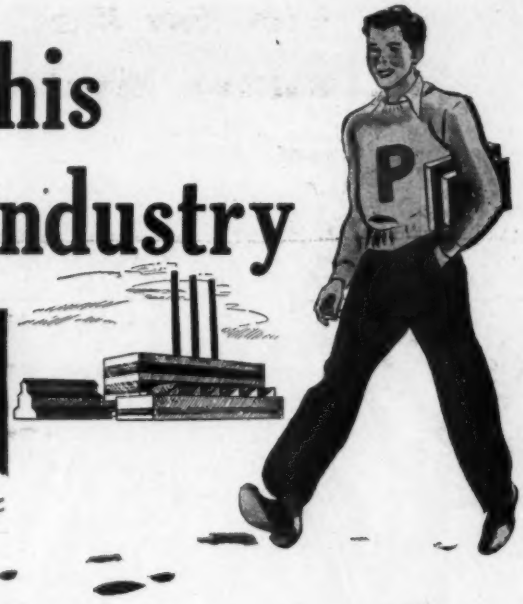


POSTER STUDYVIEW OF UNIVERSAL STYLE MILLING MACHINE Classroom instruction in the proper use of a milling machine and in the function of its various controls will be aided by the 40" x 60" studyview of a universal milling machine you can obtain from Kearney & Trecker. This visual aid provides the beginner in shop practice with a clearly defined illustration of the machine showing its basic construction, and identifying the principal elements for operation and maintenance.*

*NOTE: *All applications for free visual aids should be submitted on official school letterhead.*

**Students may make individual purchases of milling practice books. No official letterhead required.*

Train him for his place in industry



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TRAINING your students with the tools they'll use in industry is the surest way to help them make the jump from school shop to industrial job! That's why you'll find Black & Decker Tools in hundreds of schools!

Production, maintenance, construction, automotive repair . . . there's scarcely a spot in industry where you won't find B&D Tools speeding up a vast variety of jobs. What's more, B&D Tools are easy to handle, help your students learn faster. They're safe to use, reduce nervousness. And, in the long run, B&D Tools cost you less because they outlast cheaper types, even under inexperienced handling.

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Your Guide
to better training tools

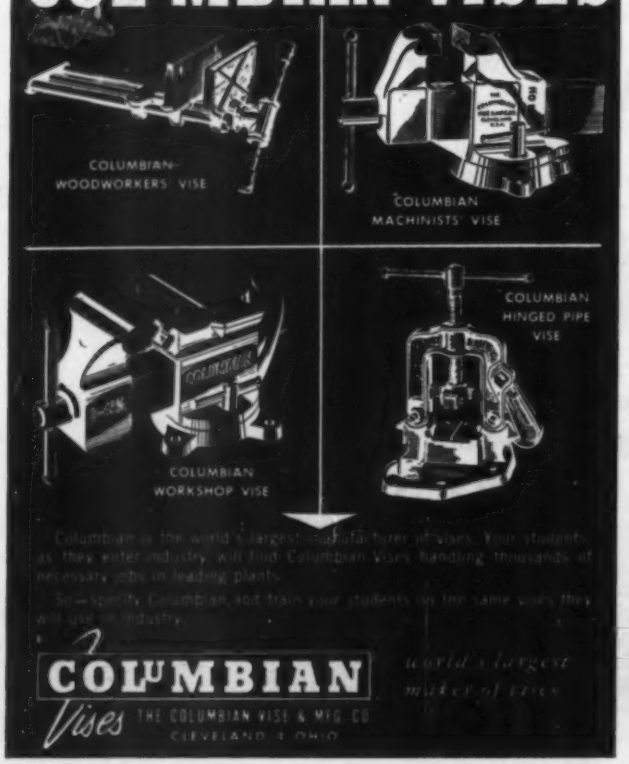
A great many schoolmen have learned that this 104-page Snap-on catalog is a welcome, reliable guide. The 4,000 Snap-on hand and bench tools, pictured or described, ideally fulfill the all-essential requisites of automotive and aviation school shop equipment.

They are the very tools preferred by tens of thousands of professional mechanics—tools these men buy to help them earn their livings. You'll agree that tools chosen by a group so critical *must* be extremely well designed, excellently made, sturdy and durable.

Every dollar of your shop budget invested in Snap-on tools is prudently placed, for the greatest good of the students and the longest stretch of the school's funds. Catalog Free to school officials and shop instructors.

SNAP-ON TOOLS CORPORATION
8074-J 28th Avenue • Kenosha, Wisconsin

COLUMBIAN VISES

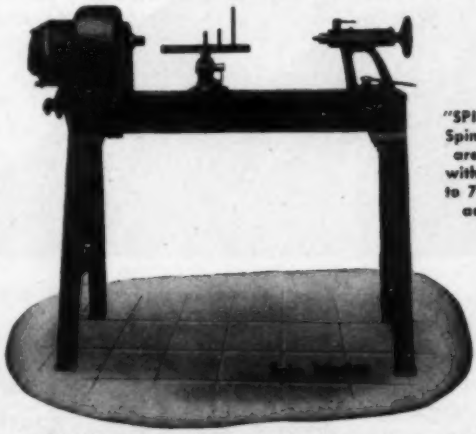


Columbian is the world's largest manufacturer of vises. Your students as they enter industry will find Columbian Vises handling thousands of necessary jobs in leading plants.

So—specify Columbian, and train your students on the same vises they will use in industry.

COLUMBIAN Vises
THE COLUMBIAN VISE & MFG. CO.
CLEVELAND 4, OHIO
world's largest maker of vises

Spin Master
REG. U.S. PAT. OFF.
15 "METAL SPINNING LATHE"



"SPIN MASTER" Spinning Lathes are available with swings up to 72", also all accessories.

- Spin Master Metal Spinning Lathes are known in the trade to be the most substantial and the most productive causing least operator fatigue.
- They are also best for training purposes.
- The Model MS 15 shown above is not a converted wood turning lathe. It is engineered for fast production spinning. Available with floor or bench legs.

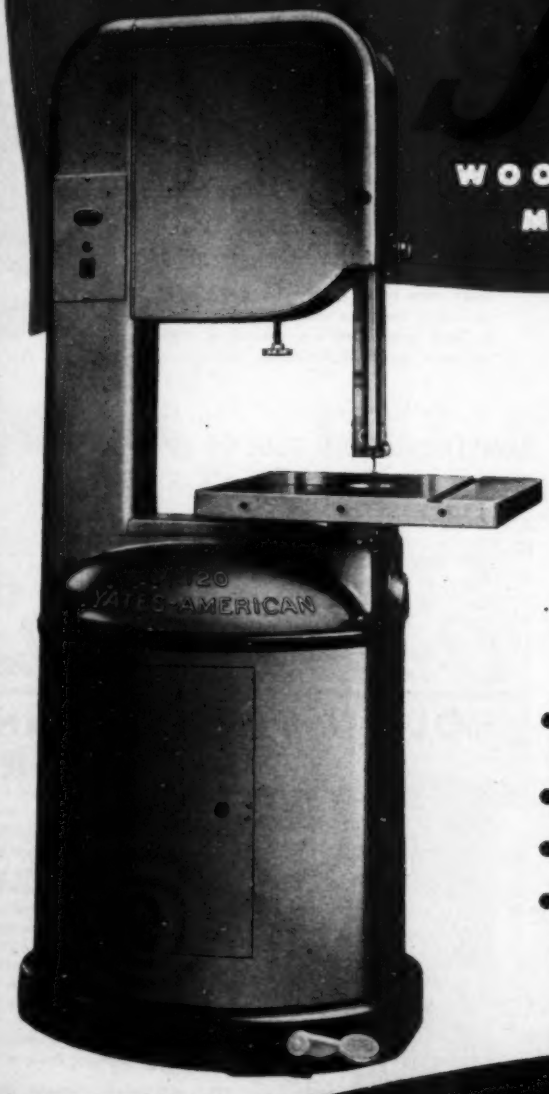
Write for particulars.

HAAG MACHINE CO.
221 WARBURTON AVE. HAWTHORNE, N. J.

"the best that money will buy!"

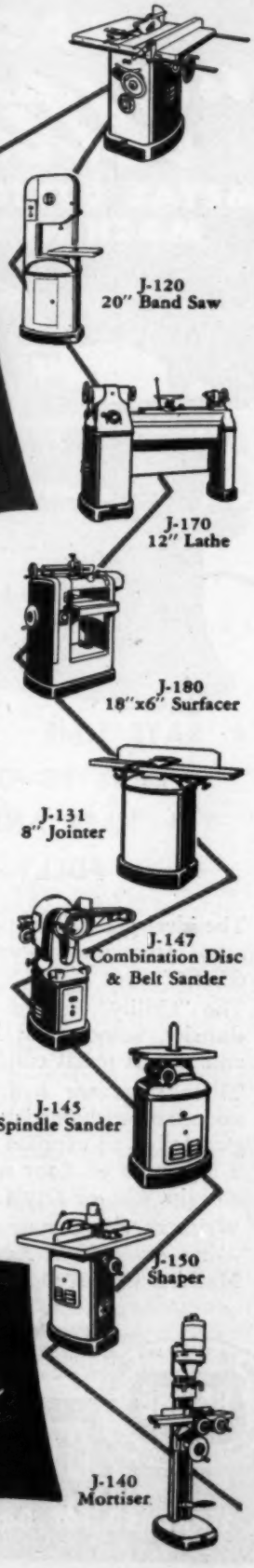
J-LINE

WOODWORKING MACHINES



Yes, "the best that money will buy" . . . is the acclaim given J-LINE woodworking machines by schools and light industry the country over! Send for complete information on this modernly designed, quality line . . . engineered and built by Yates-American . . . leaders in woodworking machinery since 1883.

- COMPLETELY EQUIPPED READY TO INSTALL
- DESIGNED FOR SAFETY
- STURDILY BUILT
- EASY TO OPERATE AND MAINTAIN



J-120 20" Band Saw

J-170 12" Lathe

J-180 18"x6" Surfacer

J-131 8" Jointer

J-147 Combination Disc & Belt Sander

J-145 Spindle Sander

J-150 Shaper

J-140 Mortiser

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RACINE "Utility" METAL CUTTING MACHINES

★ SAVE TIME
★ EASY TO OPERATE
★ FAST AND ACCURATE
★ FULLY HYDRAULIC

The ideal general purpose saw for cutting any metal from screw stock to tool steels up to 6" x 6" size.

The "Utility" is used in large and small industries, schools and institutions for general and special metal cutting work.

These saws are hydraulically operated for smooth oil-cushioned metal cutting. Completely guarded — no exposed gears or belts. Require a minimum of floor space. Models are available in Wet or Dry Cut styles.

Write us about your metal sawing problems — no obligation. Address Racine Tool and Machine Co., 1780 State St., Racine, Wisc.

Investigate our complete line of Oil Hydraulic Pumps, Valves and Systems. Ask for Catalog P-10-D.

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STANDARD FOR QUALITY AND PRECISION

ARMSTRONG
Drop Forged
LATHE DOGS

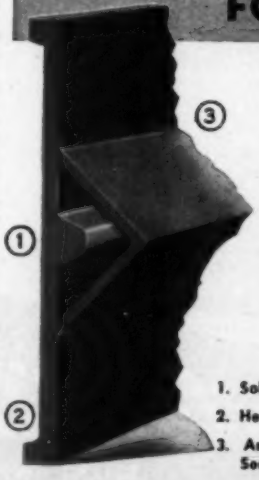
ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and, are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for Catalog.

ARMSTRONG BROS. TOOL CO.

5222 West Armstrong Ave., Chicago 30, U.S.A.

STERLING is the *Original* and *Only* ROLLED STEEL CHANNEL FOUNDRY FLASK



When you specify Sterling Flasks, you get the very best that money can buy. For Sterlings are backed by almost a half century of "know-how" in fabricating precision-built foundry flasks. Sterling pioneered and perfected the famous ROLLED STEEL CHANNEL construction, long proven superior under rough foundry usage. That's why, today, you will find Sterlings in more than 4500 foundries. Write for Catalog No. 60 describing the complete line of Sterling Foundry Equipment.

STERLING WHEELBARROW COMPANY
Milwaukee 14, Wis., U.S.A.

1. Solid Rolled Reinforcing Rib
2. Heavy Square Flanges with Full-Width Bearing
3. Angle Reinforcement Welded Around Flask Section

TRAY-TOP CINTILATHES

GET STRAIGHT "A's"

in school shops — because . . .

They're ADAPTABLE

to a wide range of operations on hard or soft steels, cast irons, non-ferrous metals, with high speed or carbide tools. 12 speeds, all geared, in geometrical progression, 40 to 1 overall ratio. 48 thread and feed changes. Top speeds to 1800 rpm.

EFFICIENT

Simple, direct motor drive, minimum gear contacts; shaved gears; spindles mounted in large anti-friction bearings, effective lubrication throughout.

CONVENIENT

Centralized controls; instant selection of speeds with unique direct-reading "color-match" dial; dual control levers, easy-to-read thread chasing dial; graduated tailstock barrel; "Tray-Tops" for convenient parking of tools, etc.

DURABLE

Anti-friction and oilite bearings, amply lubricated; integrally splined shafts and spindle of hardened alloy steel; Flamatic hardened gears in headstock, apron, and quick-change gear box; ground bedways, hardened if you specify.

SPACE SAVING

With two cabinet legs and "Tray-Tops" for parking tools, the ordinary storage cabinet becomes unnecessary.

SAFE

Control levers and snap levers disengage if something accidentally falls on them; long taper key drive spindle (chucks and face plates cannot spin off); electrical equipment fully enclosed; "Tray-Tops" keep wrenches, tools, gages off carriage wings and ways; cabinet legs store chucks and face plates away from operator's feet.

AND LOW IN COST

Tray-Tops are truly economical. For example, the 15" x 42" Toolroom Model, with taper attachment, flame hardened ways, two chucks, and regular equipment including 2 hp motor sells for only $3,865.00, f.o.b. Cincinnati.

OF OUTSTANDING VALUE

For straight "A's", school shops must have training equipment as modern and efficient as that in industry. Tray-Top Cintilathes not only have the features that serve 85% of most light duty lathe requirements: they help students learn the most about lathe work on the same equipment they will meet in industry after graduation. Best of all, Tray-Tops are priced within the reach of even modest school budgets. Make Tray-Top your next buy because it's your best buy.

CINCINNATI LATHE & TOOL CO.

Cincnnati 9, Ohio, U.S.A.

The Sensationally NEW Low-Priced

PARKS No. 20
20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dept. 22 A8 1546 Knowlton St., Cincinnati 23, O.

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"C" CLAMP

Ⓗ HARGRAVE Tested Tools

HAND SCREW

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"A CLAMP FOR EVERY PURPOSE"

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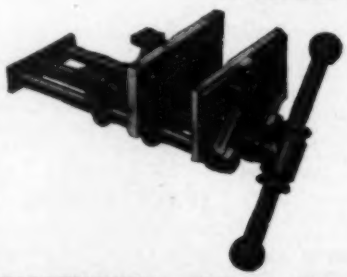
WASHER CUTTERS

THE CINCINNATI TOOL COMPANY
Waverly & Main Cincinnati 12, Ohio

Desmond
A COMPLETE LINE OF VISES



accuracy
economy
permanence

WOODWORKERS VISE — Heavy deep-threaded screw, adjustable steel dog, jaws accurately ground on three sides and faces, drilled for wood facings, quick-acting or continuous screw. Nine models.

unbreakable
steel slide
protected screw

MACHINISTS VISE — Guaranteed for vise life! Exclusive unbreakable steel slide, non-pinching type handle, removable jaw inserts, full swivel base — a solid, accurately machined tool. 11 models, 27 sizes.

Select vises for every application from the complete Desmond-Simplex line at your supplier's, or write to DESMOND-STEPHAN MFG. CO., URBANA, OHIO.

DESMOND-SIMPLEX

TEACHERS EVERYWHERE
NOW USE
THIS GENUINE
HIDE GLUE
NO MIXING
NO HEATING
NO CHILLED JOINTS
NO ODOR
AVAILABLE IN
6 SIZES
TUBE, QUARTER-PINT, HALF-PINT, PINT, QUART AND GALLON
HIDE GLUE AT ITS BEST
Exactly like the fine old hot hide glue you know is best for all woodwork—yet it is ready to use right out of the can. No waste because of over-mixing or spoilage. Ready when classes start, Foolproof for beginners.
WILL NOT DULL TOOLS
Franklin hide glue never gets hard or brittle. It is resilient and tough like raw hide. It is easy to use and easy on tools.
DOES NOT STAIN WOOD
MAKES JOINTS STRONGER THAN THE WOOD ITSELF
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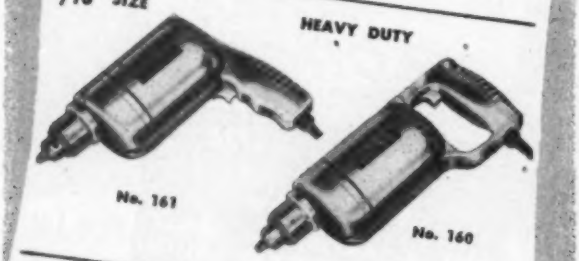

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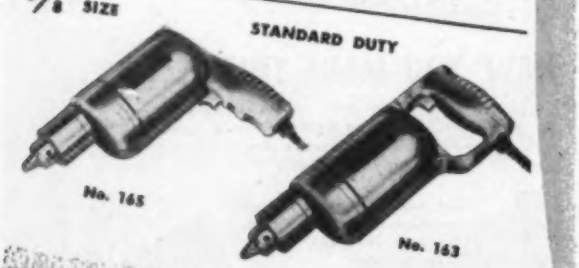

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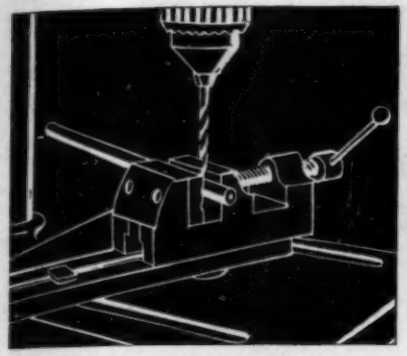
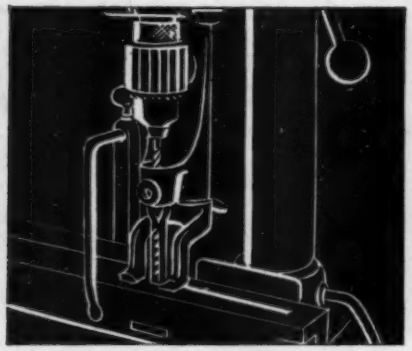
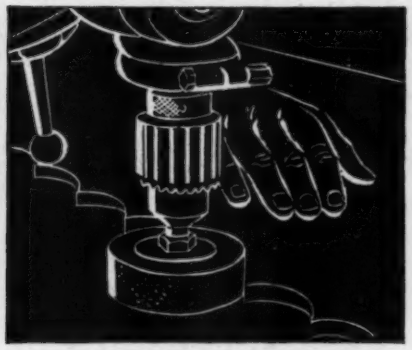


For drilling—capacity to ½" drills. A wide range of speeds and dependable accuracy make this an ideal machine for school shops.



For mortising, simple attachments enable the student to cut mortises equal in quality to those of the modern furniture factory.



For sanding irregular and straight edges of lumber, a sanding drum is held in the regular drill press chuck.

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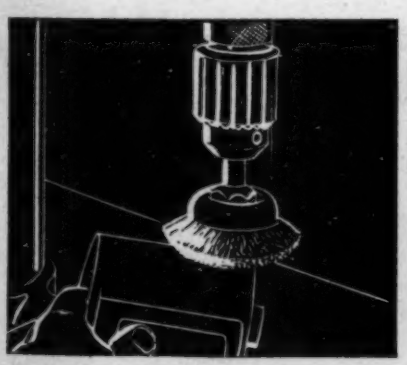
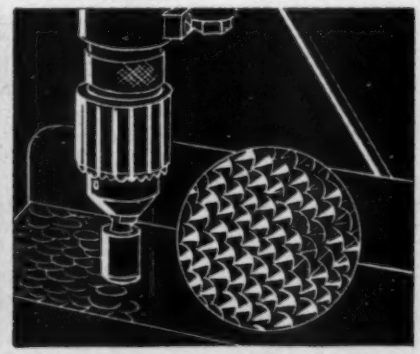
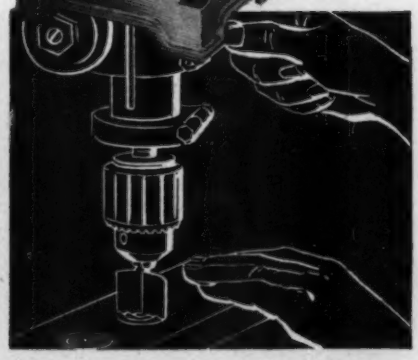


For removing rust, scale and paint—with a wire end brush attached to the spindle, the easily controlled pressure of the drill press readily removes hard incrustations such as these.



For spot polishing and finishing—bare metal surfaces (of machines) can be given a new "precision" finish by using an improvised polishing tool and running drill press at slow speed.



For shaping ornaments—plain faced bits, ground to form the ornament design (and held by the chuck) enable drill press operator to cut ornaments with professional accuracy.

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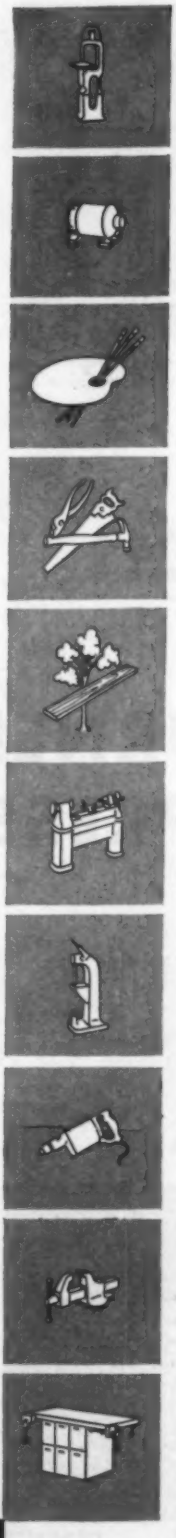

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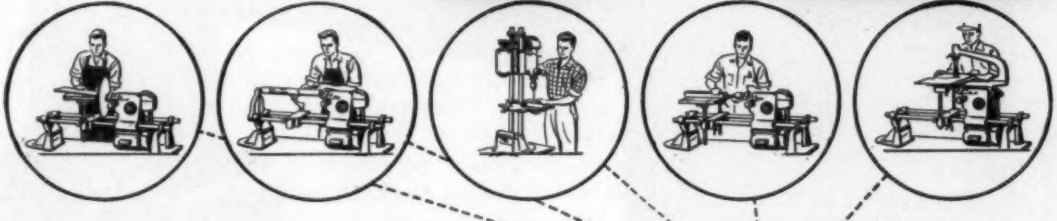

IT HAPPENS in the best of shops—work piles up on various single-purpose power tools. Students stand idle awaiting their turn. Machines not in demand are idle, too.

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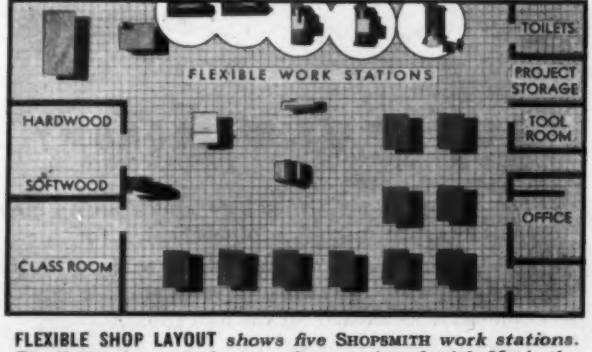

FLEXIBLE SHOP LAYOUT *shows five* SHOPSMITH *work stations. Flexibility is equivalent to shop equipped with 25 single-purpose tools. Arrangement provides maximum efficiency at minimum cost and in minimum space.*

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Please send me complete information about the FLEXIBLE SHOP and the applications of SHOPSMITH to industrial arts education.

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INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

OCTOBER • • • • 1951

Industrial Arts in the Elementary School

CLAUDE E. NIHART
Head Supervisor
Vocational and Practical Arts
Los Angeles City Schools
Los Angeles, Calif.

Reports from towns and cities in many states indicate increasing interest in the industrial-arts program on the elementary school level. In some areas a major expansion is under way. Especially is this true in Los Angeles — a city with 344 elementary schools staffed by approximately 6000 teachers — where industrial arts is taught in the classroom by classroom teachers.

Three full-time supervisors serve the elementary schools. With kits of tools, materials, and sample projects they visit schools, where they assist with classroom problems, give manipulative demonstrations, and conduct in-service training classes for teachers.

An industrial-arts workshop, centrally located, equipped with tools and materials, is open at all times to teachers who wish instruction. Workshop meetings are scheduled in remote districts for teachers unable to travel to the Central Workshop. The preparation of instructional material and the training of teachers in tool skills and construction processes goes on continuously.

The equipment in the primary grades is limited to sawhorses, a few simple hand tools, and a portable tool truck which can be moved from room to room as need arises. See Figure 1. Most of the work is done on the sawhorse. For example, when sawing, the pupil clamps his material on the horse and avoids nicking his fingers by holding a small block against the saw when starting the cut. For nailing, his work is also placed on the sawhorse.

Fig. 1. Primary grade equipment

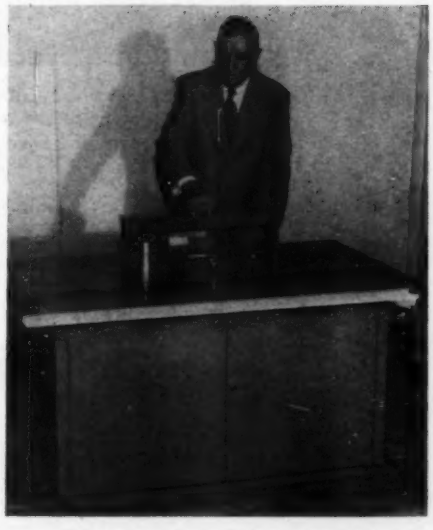


Fig. 2. Raising the tool panel

In the Primary Grades

During the past few years industrial-arts supervisors have given the major portion of their time and attention to the program in the primary grades. With the co-operation of administrators and teachers, the first-, second-, and third-grade programs have grown to a point of general acceptance. In hundreds of primary classrooms pupils are giving realism to their social studies experiences by constructing miniature trucks, boats, trains, buildings, and other articles pertaining to the regular work of the classroom.

In the Upper Grades

In the meantime industrial arts in the upper grades (4, 5, and 6) has been moving ahead more slowly. This school year increased attention is being given to these grades. The three field supervisors working with the head supervisor of vocational and practical arts are developing pilot programs in a limited number of classrooms. In these rooms a designated area is given over to construction work. So that the pupils may have adequate facilities, experimental workbenches have been designed and built especially for the industrial-arts areas (Figure 2). Each bench is equipped with a two-sided raising-and-lowering tool panel supported by sash balances and has cabinets underneath for the storing of lumber, supplies, and additional hand tools. Four small vises are clamped to the corners of the bench and may be removed when not in use. The bench is 30 in. high with a 36 by 60-in. maple top. It accommodates from four to six pupils. Only one bench is assigned to an area in a classroom. Plans are also under way to modify salvage woodworking benches by fitting them with storage cabinets underneath and entirely refinishing them (Figure 3). This will make the installation of an industrial-arts area less expensive.

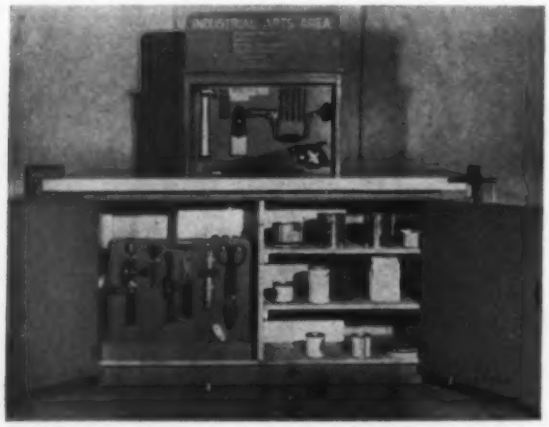


Fig. 3. Storage cabinets for supplies and extra tools. Lumber storage cabinets at each end of bench are not shown

The Instructional Program

Industrial arts in upper grade classrooms serves the individual interest of pupils by allowing them to plan and make seasonal, personal interest, and home workshop projects. It also serves individual and group needs of boys and girls in the social studies, music, science, and arithmetic. To satisfy pupils' needs for leisure-time activities, a number of handicrafts are carried on in classrooms and later in home workshops. These include copper tooling, silk screen, leaf printing, leather, and plastics.

Suggested Projects and Activities Centering Around the Industrial-Arts Area

Seasonal Projects: At Christmas time it has been a tradition in our schools for boys and girls to make gifts for mothers and fathers. These gifts are greatly appreciated, especially if the articles have practical use and represents the child's best work. Simple and well-designed projects make fine gifts and provide educationally sound experiences in the use of materials and tools.

The making of seasonal projects should not be limited to boys. Girls enjoy working with tools and materials if there is proper motivation.

Six to eight weeks should be allowed for seasonal projects with each child working approximately one hour a week. A logical work period should be set aside with about one fifth of the class working at a time.

Personal Interest Projects: One important objective of education is to serve individual needs and interests. A certain amount of school time for work on individual projects is justifiable especially when new facts, knowledges, and tool skills are being acquired. Providing opportunities to follow individual interests sometimes makes the difference between success and failure in schoolwork. For the average boy or girl personal interest projects many times necessitate reading for information, planning, solving problems, and measuring, which calls for practical application of the academic skills.

An example of the personal interest project is the model yacht built by the pupils and sailed in the city schools' annual regatta held in June of each year in one of the city parks. Many children have had the joy of building yachts and have felt the thrill of sailing competition.

Home Workshop Planning: Boys and girls need hobbies; and the best place to carry on these hobbies outside of school time is a home workshop.

The teacher can interest the children in home workshops by assisting in the necessary planning, and by showing what can be made with inexpensive easy-to-get materials. When tentative plans are worked out, the child will confer with his parents concerning tools, materials, and bench space.

After plans have been made, it is suggested that the teacher have the child make tool hangers, nail containers, shelves, etc., as time permits. These can be taken home and installed in the home workshop.

The teacher need not shoulder all of the responsibility of setting up home workshops since experience has shown that parents are eager to provide working facilities for their children, but generally need guidance.

Handicrafts: There are a number of handicrafts that can be carried on in the classroom or in the home workshop. These include copper tooling, silk-screen printing, leather tooling, leaf printing, and plastics.

Social Studies Projects: There are many worth-while construction problems found in the social studies. A definite amount of time is provided during the week to work on the various needs of a unit.

Because these needs are usually quite diversified, pupil committees are formed and work on the different problems. The industrial-arts area provides tools, materials, and space for the committees working on construction problems.

Music Projects: The making of rhythm instruments by the sixth-grade children is

the study of South America, for example, is a worth-while activity. Not only do the children use different kinds of tools in making the instruments, but they use various art principles in decorating them.

Working plans are available to teachers on how to make rhythm instruments. These can be obtained from the industrial-arts workshop.

Science Projects: There are many science activities and experiences that are necessary in the lives of children to answer the many questions about the world in which they live. Children sometimes miss these opportunities because of the lack of necessary equipment and apparatus.

Some of the science projects that can be made are electromagnets, telegraph keys, cages, insect mounts, weather-station equipment, and similar projects.

Arithmetic Projects: It is suggested that upper grade children construct the arithmetic teaching aids that have proved to be of value, thereby contributing to the needs of the class and receiving concrete experience in various arithmetical principles.

The teaching aids include squares, circles, and cubes cut up into fractional parts.

NOTE: The use of the industrial-arts area need not be limited to the foregoing activities, but should fill other legitimate needs of the individual, class, and school.

Organization

The organization of the industrial-arts area must be carefully planned. The success of the industrial-arts program will be determined in a large measure by the smooth operation of the area and its facilities.

The workbench should be located in the classroom under the immediate supervision of the teacher. It should be in an ideal location where there is elbow room, and where it is convenient to other classroom activities.

Before any work is undertaken by the pupils, the teacher should explain to the class the organization of the industrial-arts area. This entails planning with the class concerning the selection of groups to work, cleanup and maintenance, care of tools, and general safety.

A responsibility chart should be set up on a permanent or rotating basis listing the pupil in general charge of the area, and those responsible for keeping tools, supplies, and equipment in order.

If the workbench is located near a bulletin board, the responsibility chart can be posted along with other printed materials and pictures relating to class organization and current classwork.

Books, magazines, pamphlets pertaining to woodwork, crafts, hobbies, science, etc., should be kept on a bookshelf near the industrial-arts area. A small drawing board should also be available for the making of working drawings.

Conclusion

Industrial arts in the upper grades of the elementary schools in Los Angeles is not an entirely new program. Some phases of the work have been carried on for several years but the program on the whole lacks participation of a large enough number of schools to be generally accepted. The experimental programs now under way should result in a much wider participation.

Tools Used in the Upper Grades

(2) 16-in. crosscut saws
(1) 10-in. backsaw
(2) 7-oz. hammers
(2) 6-in. try squares
(2) 4-in. C clamps
(2) block planes
(1) hand drill
(1) each, straight shank drills, 1/8, 5/16, and 1/4 in.
(1) brace 8-in. swing
(1) set dowel bits, 1/4, 3/8, 1/2, 3/4, 1 in.
(2) coping saws
(1) scratch awl
(1) 8-in. half round cabinet file
(1) 8-in. mill file
(1) 8-in. slim taper file
(1) 8-in. rattail file
(4) file handles for 8-in. files
(1) file card
(1) nail set
(1) countersink
(1) pair side cutting pliers
(1) 2-in. screw driver
(1) pair tin snips
(1) marking gauge
(2) 12-in. rules
(1) spokeshave
(1) compass saw

Equipment

(1) woodworking bench
(2) sawhorses
(2) bench hooks
(1) miter box

Preparation and Upgrading of Industrial-Education Personnel

EINAR E. SIRO
Professor of Industrial Education and Head of the Department
Chico State College
Chico, Calif.

(*Continued from page 267 of the September, 1951, issue*)

Teacher Supply

Shortage. In approximately one half of the 38 states reporting there was a shortage of industrial-arts teachers in 1948–49. These states could have used 523 or more additional industrial-arts teachers. In approximately one third of the states there is need for additional industrial-arts teacher training facilities as these states rely in part or totally on other states to supply their industrial-arts teachers. State departments of education exert little or no control over the numbers and types of industrial-arts teachers trained within their states.

Near Future. For the next four years the training institutions in this country will be training sufficient numbers of industrial-arts teachers to meet the anticipated needs.* The problem appears to be one of distribution and of getting graduates to accept positions in education rather than in other types of work.

The main sources of vocational-industrial teachers available to the local administrators are the state departments, the

*This estimate did not consider needs arising from the drafting of students and young teachers into the armed services.

RANK ORDER COMPARISON OF ITEMS NOW CONSIDERED IN SELECTING AND PREDICTING SUCCESS OF CANDIDATES FOR TRAINING IN INDUSTRIAL EDUCATION WITH THOSE THAT RESPONDENTS CALL BEST
(Based on a checking of five)

Now Considered (132 institutions)		Considered Best (130 institutions)
Graduation from an accredited high school	1.	1. Graduation from an accredited high school
Intelligence test (whole college)	2.	2. Scholastic rank in high school
Vocational interest	3.	3. Character-personality description
Personal interview	4.	4. Vocational interest
Scholastic rank in high school	5.	5. Mechanical aptitude test (whole college)
Character-personality description	6.	6. Personal interview
Physical fitness	7.	7. Intelligence test (whole college)
Subject achievement test (whole college)	8.	8. High school shop teacher's recommendation
Admittance to institution qualifies for department admittance	9.	9. Physical fitness
High school shop teacher's recommendation	10.	10. Pattern of high school work
Mechanical aptitude test (whole college)	11.	11. Subject achievement test (whole college)
High school principal's recommendation	12.	12. Department examination (Industrial Education)
Graduation from any high school	13.5	13. Secular experience, other than education
Pattern of high school work	13.5	14. High school principal's recommendation
Secular experience, other than education	15.	15. Age of candidate
Age of candidate	16.	16. Graduation from any high school
Department examination (Industrial Education)	17.	17. Admittance to institution qualifies for department admittance
High school graduation not necessary for admittance	18.	18. High school graduation not necessary for admittance

advisory committees in the field concerned, officials in local industry, teacher training institutions, and teacher placement agencies. The demand for trade teachers remains strong and the problem is one of selection and induction, plus upgrading.

The meager response received from the state departments concerning private trade schools as to numbers, state regulations, and teacher qualifications shows that there is a definite need for improved regulation of such schools to insure enrollees against educational and financial exploitation. The number of 1947–48 graduates of teacher training institutions employed by private trade schools indicates a desire on the part of these institutions to obtain college trained instructors.

Total Teachers. From data received from participating state departments of education it is estimated that there are between 25,000 and 28,000 industrial-arts teachers in the United States on a full-time or a part-time basis and 21,441 teachers of vocational industrial day, part-time, and evening classes. This gives an approximate total of from 45,000 to 50,000 industrial education teachers in the public schools. In addition, there are a large number of teachers in private trade schools; the possible total being suggested by the fact that there are 7304 private trade school teachers in 14 states. If we add to the foregoing classifications the persons at work in penal and custodial institutions, social agencies, corporations, apprenticeship plans, etc., it is safe to conclude that there are 100,000 men and women doing industrial teaching outside the training institutions.

Certification

Industrial Arts. While industrial teacher certification requirements were found to vary greatly among the states certain generalities and differences deserve emphasis. In the majority of the states the first certificate issued is a temporary one, although in four states the first certificate may be a life certificate depending upon the qualifications of the applicant. Nine states do not issue life certificates. In the other states the bachelor's degree or a degree and successful teaching experience are the usual requirements.

Of 38 states reporting 82 per cent require the bachelor's degree for certification to teach industrial arts. One state requires five years of college preparation for a regular certificate. A poll of opinion of respondents indicates that the majority favor requiring four or more years of college preparation for certification.

Eighty-four per cent of the states reporting grant certificates exclusively on transcripts of credits. Other states employ in varying combinations such additional criteria as trade experiences, physical examinations, loyalty tests, personality ratings, and social participation records. Many of the states reporting do not require any definite number of credits in specific fields or subject areas but rather depend upon the standard maintained by approved collegiate institutions. Only 13 per cent of the states reporting fail to require that practice teaching be in industrial arts for those planning to teach industrial arts. Only three states report different requirements for teaching in junior and senior high schools.

Vocational Industrial. In 38 per cent of the states furnishing data the certification of vocational-industrial workers in the schools is one of the duties of state vocational-education departments; in 60 per cent the departments of certification are separate from the state vocational industrial education departments; and in 2 per cent certification is not required.

In 82 per cent of the states the professional courses approved or required for certification of the various vocational industrial-education school workers are named in the state plans for vocational education. These requirements are stated in terms of credits, clock hours, courses, or in combinations of these. In only 11 states may all or part of these requirements be met through correspondence courses.

All the states reporting require trade experience for certification to teach vocational-industrial subjects. In 17 states years in the trade is the only basis for certification, while others consider also the concentration and variety of experience and the results of tests of competence. Fifty-two per cent of the responding states certify vocational-industrial teachers for broad assignments, 17 per cent for more specific assignments, and 29 per cent for both broad and specific assignments.

In 42 per cent of the 38 states responding neither directed observation of teaching nor practice teaching is required for certification of vocational industrial teachers; 39 per cent require both observation and practice teaching; 8 per cent require observation only; 8 per cent require practice teaching only; and 3 per cent of the states reported, "It is desirable but not always feasible."

In all but one of the states reporting the temporary or modified certificate is issued first. In one state the first certificate may be a life certificate depending upon the teacher's qualifications. Temporary or modified certificates may most frequently be renewed on the basis of additional in-service course work, satisfactory teaching records, and recommendations by local school authorities. Nineteen states issue life certificates to vocational industrial teachers. The criteria for the issuance of life certificates vary with the individual states but are most generally based upon the completion of teacher training requirements and/or degrees and successful teaching experience.

Six states reported that general school administrators (superintendents and principals) are required to take some course work in the fundamentals of vocational education.

Teacher Training and State Departments

By Designated Institutions. Forty-three states reported concerning the numbers of collegiate institutions in their states receiving federal aid (Smith-Hughes and George-Barden Acts) for the preparation of vocational industrial personnel. The institutions receiving federal aid are as follows: 1 institution (19 states), 2 institutions (5 states), 3 institutions (5 states), 4 institutions (2 states), and no institu-

tions (12 states) for a total of 52 institutions. In addition, 5 states each reported 1 institution not receiving federal aid but training vocational-industrial education personnel.

By State Staffs. Vocational-industrial teachers are trained by personnel from state departments, rather than or in addition to institutional efforts, in 35 of the 43 participating states. In 6 of these states 100 per cent of the teacher training is carried on by state department personnel, in 1 state 90 per cent, 1 state 85 per cent, 8 states 50 per cent, 2 states 20 per cent, 1 state 15 per cent, 1 state 10 per cent, and in 15 states no per cents were indicated.

In 9 states, state teacher trainers are attached to and work from the state departments of education; in 16 states they are attached to designated collegiate institutions; in 15 states they are associated with both; and in 8 states the administrative plan was not stated. In the majority of states these teacher trainers are selected or approved either by the state departments of education (vocational division) or in co-operation with designated collegiate institutions and are employed on either a 12-month or academic-year basis.

State Supervision

Industrial Arts. Much variation exists in the titles of persons who are charged with responsibility for industrial arts in the state departments of education. Six states reported employing supervisors or consultants of industrial arts on a full-time basis, 13 states on a part-time basis, and 3 that a vacancy exists. In 26 states no industrial-arts supervisor was reported. Of the 26 states not now employing state supervisors of industrial arts 16 do not intend to employ, 7 intend to, and 3 are undecided. The majority of those that desire mention lack of funds. There were a number indicating disapproval of such supervisory positions.

Twelve states employing either full-time or part-time supervisors of industrial arts furnished details concerning their supervisory programs. The service of incumbents varies from less than 1 year to 30 years. The amount of time spent by supervisors on industrial arts varies from one tenth to full time. The majority of supervisors spending less than full time on industrial arts are associated otherwise with vocational-industrial education.

Much variation was found among the lengths of supervisory visits and the methods used to determine when to call on teachers. The frequency of the supervisor's visits varies from once a year to once in 3 years, and the length of calls varies from less than an hour to one-half day, or as the needs require.

Information from 34 state departments of education indicate that the following chief methods are used in upgrading industrial-arts teachers: encouraging of state conventions, visiting by state supervisors, publishing courses of study, sponsoring area conventions, contributing to state education journals, fostering industrial-arts clubs, issuing subject matter bulletins and newsletters, and several other techniques mentioned less frequently.

Five of the 36 states reporting on the state department's attitude toward training beyond certification requirements neither encourage nor require additional work. Twenty-one of these states encourage, 7 require, and 3 both encourage and require additional training.

Course materials for industrial-arts classes are most frequently developed by the individual teachers for their own use, by committees of teachers, and by faculties of teacher training institutions.

Approximately 75 per cent of the responding states provide some advisory service for schools opening new industrial-arts programs. This service usually consists of providing equipment lists, building plans, department layouts, instructional materials, and conferences with school officials.

In 27 of the 37 states responding industrial arts is recognized when state monies are apportioned to schools. In 9 states industrial arts is not recognized, and in 1 state no state aid is granted.

Vocational Industrial. All except one of the 48 states have directors of vocational education. All the states have supervisors of trade and industrial education.

Approximately 75 per cent of the states reporting require local schools to submit plans to the state department for approval before starting vocational-industrial courses or classes. All the states responding to the question provide some type of advisory service for such schools. In the majority of states local school authorities are required to gain state department approval of persons to be employed as local directors of vocational education.

Thirty-nine of the 42 states assume leadership in providing in-service upgrading activities for vocational education personnel. The activities most commonly sponsored are: meetings or institutes, work-

This action picture won $600 in cash and the title of Grand Prize Winner in the Sixth Annual National High School Photographic Awards for Daniel Gregory of Sandston, Va., a senior at Highland Springs High School, Highland Springs, Va.

shops, curriculum committees, publications, and local industrial education clubs.

The aid most commonly given by vocational industrial supervisors to teachers in the field concern: teacher improvement; instructional materials; shops; and analysis, curriculum, and course of study construction.

Most of the states either encourage or require vocational-industrial teachers to seek additional training after minimum certification requirements have been satisfied. They suggest that this additional training be obtained through summer school enrollments, experiences in industry, in-service workshops, trade extension classes, and other less frequently mentioned ways.

Course materials for vocational-industrial classes are most frequently prepared by individual teachers for their own use, by committees of teachers, by experts from the trades under state department supervision, by specialists in course organization working with local teachers, by experts in the state departments, and by faculties of teacher training institutions. Instructional materials available at the state departments are distributed to teachers either free or at cost.

In addition to public vocational schools, other agencies receiving assistance from state department vocational-industrial personnel are those concerned with apprenticeship training programs, G.I. on-the-job training, in-the-plant training, and industrial-arts programs.

The participants in the state departments feel that functional relationships should be maintained with the following outside agencies: employee organizations or their representatives, employer organizations or their representatives, foreman organizations, personnel management groups, the United States Employment Service, and civic groups.

Some Recommendations

1. There is need for the formulation of definite sets of objectives for industrial education departments in all institutions. These will, of necessity, vary but may well show more than current consistence and objectivity.

2. A need exists for more standardization of the titles of departments training industrial education personnel, inasmuch as 35 different designations are now employed. *Industrial arts* seems appropriate for those restricting their work to this phase, as does *vocational industrial* for those of the other phase alone. For departments training for both phases, *industrial education* is popular and logical.

3. Both unit and general shops should be provided by all industrial-education teacher training institutions so that prospective teachers may become acquainted with the methods and problems peculiar to both of these typical situations. Approximately 60 per cent of the teacher preparatory institutions at the present time have both types of shops.

4. Persons in training for industrial-arts teaching should be subjected to a broad list of manipulative areas, and there should be more consistency among training institutions on this matter.

5. There is need for greater attention to analysis of the duties of teachers in service as a basis for determining content of both shop and theory courses in the training institutions.

6. The wide gaps between the numbers of freshmen and of seniors in the training institutions indicates the need for better selection of candidates and the elimination of some certain reason for dropouts.

7. The median training institution now admits high school graduates with one fourth of the diploma credit in industrial subjects. This practice is commended and advocated because of the specific background it affords and because such concentration suggests a self-selection toward the professional work in view.

8. Although it is recognized that the duties of industrial teachers vary in different parts of the country, there is need for more standardization in certificate requirements. This conclusion is forced by the fact of wide employment scatter after graduation, many training institutions contributing heavily outside their own states.

9. A more general practice of the flexible policy of some states in the certification of vocational-industrial teachers for either broad or specific fields is recommended, because it insures the use of these teachers for only the types of work for which they are best qualified.

10. There is need for more and improved supervision and upgrading of industrial-arts teachers in service; likewise, need for preparatory or later instruction for school administrators in the philosophy and practices of industrial education.

11. There is evidence of need for the development of good in-service training programs for staff members of industrial-education teacher training departments and of related and better defined bases for promotion of such staff members.

12. There seems to be need for refinement in the methods used to develop course materials for both industrial arts and vocational industrial classes, and more undergraduate teaching of course construction techniques. The study showed that individual teachers and committees of teachers in service now develop most of the course materials in use.

13. Some plan should be developed, at the master's level, for instructing candidates in the new and changing media of the industrial-arts field. Many teachers now in service are required to present types of manipulative work which were entirely missed in their preparation.

14. There would seem to be no justification for employing persons without previous teaching experience in industrial education as staff members in industrial-teacher training departments. Public school teaching experience on the secondary school level is especially valuable as background for such positions. Twenty-seven per cent of the staff members in the institutions reporting in this study had had no teaching experience prior to college teaching.

15. The college industrial-education teacher training staff members should have all possible breadth of background for teaching. Trade experience would be a valuable asset to some, while an absolute necessity for others.

16. While much work has been done regarding techniques for the evaluation of occupational experience, there should be more concerted effort to arrive at an acceptable plan. Such experience is variously recognized in terms of college credit, as a part of certification requirements, and as a consideration in salary schedules. In one third of the states evaluation for purposes of vocational certification is based wholly upon years in the trade.

17. A need exists for the provision of directed observation of teaching and of practice teaching opportunities for personnel from the trades to teach in vocational-industrial programs. Professional work required of such candidates now commonly omits or slights this important training experience.

18. More states should become better informed as to offerings and practices of private trade schools, to protect students educationally and economically. Approximately one fourth of the states now have laws to license or regulate such institutions.

Suggested Research Projects

1. Comparison and evaluation of the content of shop and professional theory courses taught to industrial-education majors or minors in teacher training institutions.

2. Analysis and evaluation of the content of courses taught to students other than industrial-education majors or minors by industrial-education staffs in teacher training institutions.

3. Shop maintenance problems of industrial-education teachers in service compared with offerings and experiences in teacher training institutions.

4. The influence of practice teaching in industrial education as a success item for teachers of industrial classes.

5. Differences among courses offered to industrial-arts majors and vocational-industrial majors in the same institutions.

6. Benefits derived from production work by course enrollees in industrial-education teacher training departments.

7. Time devoted to and sequences of various manipulative areas of work in industrial teacher training programs.

8. Benefits derived by students from club and fraternity activities sponsored by the industrial-education teacher training departments.

9. Reasons for industrial-education graduates and teachers in service accepting noneducational employment.

10. Reasons for transfers of industrial-education students within institutions and from one institution to another.

11. Distinctive features in the preparation of industrial-arts teachers for the various school levels.

12. Manipulative courses at the graduate level, possibility and type of content.

13. Analysis of the problems met by new teachers during first years of service in relation to collegiate training received.

14. Industrial education at the junior college level.

15. Comparison of techniques of teaching industrial-arts subjects at the various school levels.

16. Preparation of teachers for industrial-arts teaching in rural schools or areas.

17. Apprenticeship programs and in-the-plant training programs as integrated public school offerings.

18. The value of trade experience as a success factor for teachers of industrial arts and of vocational-industrial education.

19. An evaluation of the training received by industrial-education students in shops under the control of industrial-education departments and those not under such control.

20. Professional background of training and school experience in relation to the success of industrial-arts and vocational-industrial teachers.

21. Student and teacher-in-service reactions to college instructors in industrial education with and without public school experience.

22. Relationships existing between teachers of industrial arts and teachers of vocational-industrial education in the various states.

23. Orientation that should be given by school administrators to new industrial-education teachers.

24. Formulation of the content of basic industrial-education courses for public school administrators.

25. Comparison of instruction in private and public vocational schools.

26. Methods of training industrial-education teachers in other countries.

An interesting shot at a welder. Photograph taken at the Milwaukee Vocational and Adult Schools, Milwaukee, Wis. Submitted by Stanley O. Opsahl, instructor of photography

School Shop Planning With Three-Dimensional Models

JOHN AUSTIN WOOLLEY
Menomonie, Wis.

A common practice in industry is the use of three-dimensional models of machines and physical plants in designing efficient time and space-saving production flow lines. Preliminary planning with models has saved industrial plants thousands of dollars in initial cost. Then, over a period of years, the increased profits, due to increased efficiency made possible by this planning have been measured in millions of dollars. Teachers of industrial arts too can benefit from the example of industry, by planning school shop arrangements based on use of three-dimensional models.

Dwight Chinnock, supervisor of student teaching, industrial education division, at The Stout Institute, a Wisconsin State college training teachers of industrial arts and vocational education, has developed a practical method of shop planning which employs a flexible model shop kit. This kit consists of a board ruled off in half inch squares and an assortment of model machines and other equipment built to a size scale of ½ in. to the foot. With this model kit it is possible to set up any type of shop in any size room which a school has to offer.

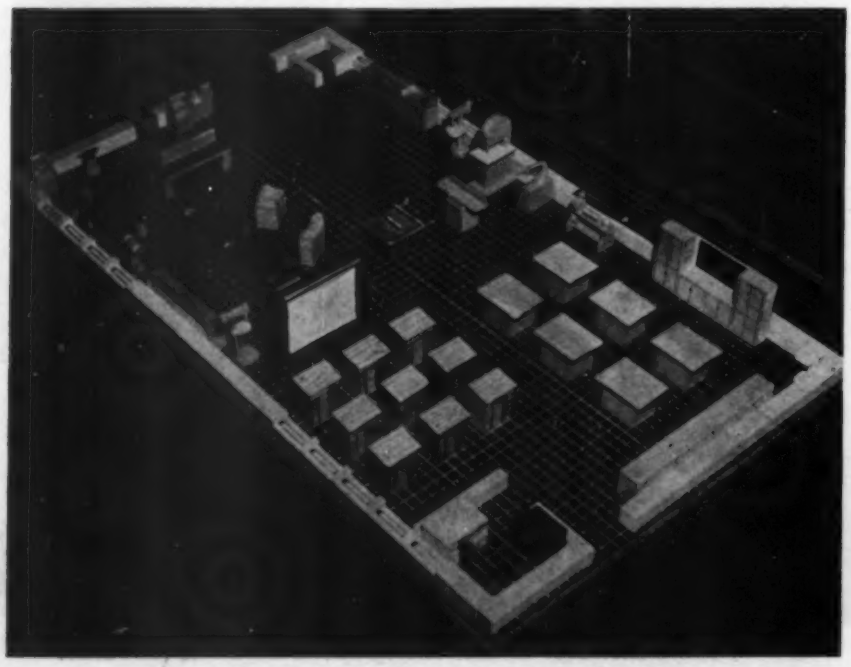
The kit was developed for instructional use in teaching Stout students the principles of shop planning. Students, by arranging the models on a marked-off floor plan of a proposed shop, instantly detect conflicts in traffic lanes, work stations, and other functions that might go unnoticed in the floor plan method of designing a shop in only two dimensions on paper.

The model technique has proved its value in such an actual application as the recent planning of a general shop for the Mauston, Wis., public high school. Arnold Potthast, a senior at Stout, used the kit to set up a general shop for members of the school board and the principal of the Mauston school. These gentlemen were impressed with the proposed shop and with the unique way in which Potthast presented the plans to them.

As a result, pictures of the model shop were taken and forwarded to the architect, who in turn drew up tentative plans. The three-dimensional modeled shop conveyed the shop idea to the planners much more easily than usual methods could have done.

The Mauston school is only one of several schools that have utilized Mr. Chinnock's modeled shop technique in planning expansion or new construction. Plymouth, Wis., public schools have recently adopted a shop plan, which was developed with the aid of Mr. Chinnock's model kit, for expansion of their industrial-arts department.

Industrial-arts teachers who are confronted with the problem of building a new plant or remodeling an old one will find model planning a real aid to doing a better job. It is unreasonable to expect all school-board members and school administrators to be able to understand complicated architectural drawings when they have had no training in that field, but they can all instantly grasp the modeled shop. That's why the *modeled shop* can produce a *model shop* for any school.



General Shop, Mauston, Wis., planned with model kit

Jay-walking is still the primary target for preventive action. More than one-third of pedestrian deaths and one-fourth of the injuries in 1950 were attributed to "crossing between intersections." When you're on foot, remember that safety is only as far as the next corner. — *The Travelers Insurance Co.*

Are You Using Your Bulletin Board?

JOHN J. DEFOURNY
Columbus, Ohio

The principles of advertising should be a part of a teacher's presentation of selling his subject. In introducing merchandise to the public, the good businessman utilizes visual aids for attracting attention and interest to his product.

In a shop situation the bulletin board is an effective means of presenting pictorial material to students. A few good rules on the physical characteristics of a bulletin board should be as follows:

Size: The board should be large enough to present satisfactory displays. Some instructors use an entire length of a wall in the shop for display space.

Location: A prominent position should be selected for the bulletin board and it should be placed at the eye level of the students attending the classes in the shop.

Material: It is preferable to select a material for the board upon which a display may be tacked.

Just as important, if not more important than the physical characteristics, is the presentation of the material displayed. Certain procedures may be employed to make the displays a *more* vital part of the shop program:

1. The display must have *simplicity, organization,* and *interest.*

2. All the *dynamics of art* such as color, arrangement, and approach should be utilized.

3. The display should be a *changing* one.

4. In the selection of themes, there can be correlation with other subjects and consideration should be given to related fields.

With the selection of a theme in mind for a display there are various resources of obtaining material for the display:

1. Write to companies for publications. Many companies will respond by sending literature with a minimum of advertisement. This material can be used very effectively on bulletin boards.

2. An important source of material is the work of the students in the shop. It can be an incentive to have displays of mechanical drawing problems, sketches and plans of students' projects, or photographs of the shop program.

3. Ask professional people in the community to contribute their work for the bulletin board.

The foregoing suggestions have all been used by the author. Figure 1 is an example of a display of a periodical received from a firm. The excellent illustrations were selected from various issues of the periodical to show the use of brick and tile in the home and in the community. To stimulate attention, the illustrations were mounted on colored art paper.

A more meaningful bulletin board is the one in which the students themselves plan and execute the display. Figure 2 is a display arranged by a student committee on the question, "What magazines in the school library pertain to industrial arts?" The instructor had discussed the possibility of such a display with the librarian before presenting the question to the committee. Returning from a successful examination of all the magazines in the library, the committee members were enthusiastic

Fig. 1

Fig. 2

and astounded at the magazines which contained references of interest or of importance to industrial arts and of interest to boys. With the initial phase of research completed, the committee examined the copies of older issues of the magazines they requested from the librarian. Front pages, pertinent photographs, and articles were chosen from six magazines and organized into a display on the theme, "The magazines in the library which pertain to industrial arts."

Dynamic displays contribute not only knowledge and interest but they give attractiveness to a shop. There seems to be an objective for youths when they see the visual evidence of the outcome of skill, industry, and training.

Leaders in Industrial Education

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(Continued from page 270 of the September, 1951, issue)

CHARLES RICKETSON ALLEN (Concluded)

Comparison With Selvidge

Four years after Allen's book appeared in print, the late Professor Selvidge published a book which dealt with some of the same problems, but with a somewhat different approach.[3] Because of the prominence of the two authors, and the nation-wide and permanent influence of the two books, it would be instructive if limitations of space permitted a comparison of the "Selvidge method" and the "Allen method" of analysis for the purposes of trade teaching. Since this is not possible, I may refer the reader who is interested in further study to two instructive and suggestive sources.[4]

Indicative of the fundamental depth and significance of the contributions under discussion are the following comments of the two critics cited. It is to be noted that they are not in full agreement.

1. "Allen's method is easily much superior to Selvidge's for dealing with beginners, but probably in the hands of the average teacher would prove inferior for dealing with students who have passed the novice stage. Selvidge's method would probably, though not necessarily, prove to be the better method for use with adults as contrasted with immature learners."

2. "The Allen method is specifically applicable to the occupation or job of the adult, the skilled worker, in material production. The Selvidge method is specifically applicable to the youthful learner in the trade school or vocational school. . . . The first outstanding difference between the two is the brevity of the one and the verbosity of the other. A trade teacher who tried both is reported to have said, 'one needs to read between the lines of Selvidge, but only every third paragraph of Allen.' To the extent that this constitutes a criticism, of course, it applies to both authors."

Some Features of the Allen Method

It is probably fair to both to say that the Allen method has made its greatest contribution in the training of workers, foremen, and instructors in industrial plants, and that the Selvidge method has found its greatest usefulness in the trade school and in the institutional preparation of industrial teachers, although the separation has been far from definitive or mutually exclusive. It is noteworthy that the armed forces schools have made extensive use of the Selvidge method in the training of military personnel.

The first characteristic of Allen's book to be noticed by the student is the use of a variety of special and unusual terms not encountered elsewhere in textbooks on education. The Allen method analyzes a vocation into its component work jobs, and these in turn into specific operations to be performed, and then sets up instructional procedures which upon first acquaintance seem unduly complicated. The method calls for detailed lesson planning, preparation of questions designed to develop and promote thinking about the jobs, preparation of demonstrations, and periodical inspections and checking of progress.

One characteristic that causes the procedure to seem somewhat baffling to the beginner is the adoption of unusual terminology, the significance of which must be mastered before the learner can get very far. Here are some examples, to illustrate what is meant by "using the language of the man in the shop," and avoiding anything pedantic, or that savors of "pedagese".

"Putting things over." "One of the important points in effective training is to see that the men who are used as instructors really know how to 'put over' what they know. . . . After all, a teacher is only somebody whose business it is to put things over—to teach."

"Getting down to brass tacks" evidently means to eliminate the nonessentials, and confine attention to the fundamental things which must be learned or skills which must be mastered.

"Jumping-off point" is essentially the point at which the learner "jumps off" from what he knows to what he doesn't know and is to be taught.

"Checking levels" refers to a series of stages in the learner's

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[3]Robert W. Selvidge, *How to Teach a Trade* (Peoria, Ill.: The Manual Arts Press, 1923).

[4]D. J. MacDonald, "A Comparison and Criticism of the Allen and Selvidge Methods of Teaching a Trade," Industrial Arts and Vocational Education Magazine, 12:11, Nov., 1923, pp. 413–419 (Milwaukee, Wis.: The Bruce Publishing Company). William H. Stone, "Review and Criticism of Analysis by the Allen, Selvidge, and Charters Methods." A paper read before the National Vocational Guidance Association, Cincinnati, Ohio, February 20, 1925. *Industrial Education Magazine*, 26:11, May, 1925, pp. 321–324 (Peoria, Ill.: The Manual Arts Press).

progress from start to finish at which the instructor applies checks or tests to determine how far and how rapidly the learner is advancing.

"Progression factors" are those things that affect the speed, ease, and thoroughness with which a learner progresses through an order of instruction.

"Instruction by tying up" is another way of expressing the idea of facilitating the learning process by connecting new experience with the knowledge or skill already possessed by the learner.

"Conversion base" refers to the knowledge, skill, and experience in a man's old trade that he can make use of in the process of acquiring a new trade.

Based on Practical Experience

Whatever the effect produced on the academic mind by these characteristic and expressive terms, the book and the method have proved eminently successful in the hands of trained leaders in the upgrading of workers in industry, in the production of armies of skilled and semiskilled mechanics, and in the development of new concepts of the functions and possibilities of foremen and instructors in industrial plants. The basic reason for these achievements is doubtless the fact that the material for this book, and the refinements of methods and procedures, were the direct outcome of practical experience in the early days of the industrial school in New Bedford; later of experience with a wide variety of problems and conditions in all types of industrial schools under his supervision in Massachusetts; and still later worked over during his term of service with the Emergency Fleet Corporation during World War I.

Training Shipyard Workers

One of Mr. Allen's significant and far-reaching contributions to the progress of industrial education was made during his term of service as assistant director of training for the Emergency Fleet Corporation of the United States Shipping Board, October, 1917, to November, 1918. Those who are old enough remember this year as including the darkest period of World War I, when the depredations of hostile submarines, coupled with disastrous military reverses, threatened the complete collapse of the Allied war effort. It was imperative that the contribution of the United States to the common cause be stepped up enormously and with the utmost possible speed. One of the measures proposed was the building of a "bridge of ships" across the Atlantic, to insure the landing on the eastern shores of men, equipment, and supplies in sufficient quantities and before it would be too late.

To meet this demand the Congress authorized the creation of the Emergency Fleet Corporation for the purpose of accelerating the production of ships. It was discovered almost immediately, (1) that existing shipyards must be expanded and many new and larger ones built; (2) that the supply of mechanics was utterly inadequate to carry out the requisite shipbuilding program; and (3) that the necessary expansion in shipbuilding depended absolutely on the creation of vastly increased forces of skilled and semiskilled workers.

In order to secure the huge army of workers required, it was decided to set up a training division in each shipyard. To develop plans for these training divisions, an industrial training section of the Corporation was organized, with headquarters in Washington. At its head, as director of training, was Egbert E. MacNary, who secured leave of absence from his position as director of industrial education in the city schools of Springfield, Mass. One of the first needs was a supply of instructors, to meet which an instructor-training center was established at the plant of the Newport News Shipbuilding and Drydock Corporation at Newport News, Va. Charles R. Allen was granted leave of absence by the Massachusetts State Department of Education to take charge of the instructor-training center, with the title of assistant director of training.

The plan of operations provided that each shipyard was to send to the instructor-training center a delegation of skilled workers, carefully selected to meet certain qualifications suggested for prospective instructors, and in accordance with quotas set up by the Shipping Board. The candidates for training reported to Newport News in groups of 150, and remained for six weeks of intensive training. One half of each day was spent in the study and discussion of teaching methods and devices, while the other half was spent in practical experience in the shipyard instructing groups of workers, under the supervision of the training staff, which was organized and directed by Mr. Allen.

During the winter I had the rare privilege of a visit to the instructor-training center at Newport News, having received an invitation to join a small party made up from the staff of the recently organized Federal Board for Vocational Education. I was employed at the U. S. Bureau of Education at the time. The trip was a memorable one for several reasons. First, it took place in February, 1918, during one of the worst visitations of winter weather experienced during my nine years in Washington. We decided to take the steamer trip down the Potomac river, leaving Washington at about 5:30 o'clock in the evening, and disembarking at Old Point Comfort the next morning about 7:00 o'clock.

During that night and the following day the temperature dropped so low that the Potomac river was frozen over from shore to shore, from Washington nearly to the entrance into Chesapeake Bay. According to the newspapers, this was the first time the river had ever been completely frozen over since the Weather Bureau began keeping records. We planned to spend one day at the shipyard, and to return to Washington by steamer that evening. During the day we learned that our steamer would probably not be able to make the trip that night because of the ice. However, we made the return trip almost on time, and learned that an icebreaker had been cruising up and down to keep a channel open. It was a thrilling experience to sail up the river through a narrow channel, scarcely wider than our ship's beam, with solid ice stretching to the shore on both sides.

The visit to the shipyard was a memorable experience. Because of the requirements of military security the members of our party were carefully "screened," identified, and vouched for. Inside the plant, we were taken to the quarters assigned to the school, where we listened to a detailed exposition of the plan of organization, personnel, equipment, and methods of instruction, including the machinery set up for selecting the men who were sent to the school by the co-operating shipyards over the country.

The curriculum outlined for the instructors-in-training included: (1) analysis of the operations involved in the various jobs in shipbuilding; (2) analysis of the teaching operations or steps

in teaching these jobs; (3) planning the steps in instruction and organization of procedures; (4) study of methods and devices for giving effective instruction; (5) preparation of instruction material, both mechanical and technical; (6) development of training plans to meet special conditions characteristic of the various shipyards.

To give some idea of the magnitude of the task assigned, we were told that the Emergency Fleet Corporation had announced that a minimum of 60,000 new trained workers would be required at the earliest possible date in the Philadelphia district alone. The needs in other parts of the country were under investigation, and were announced later. After this briefing we were taken on a tour of inspection through the yard.

It was a huge establishment. I do not attempt to convey an idea of its physical proportions, but there seemed to be an incredible number of ships under construction. One section of the yard was devoted to the building of a fleet of destroyers, which were to be sent out to active sea duty just as soon as they could be completed, fitted out, and manned with crews that were even then in training. We were not permitted to enter this section of the yard, but could observe operations at a distance.

I have through the years visited industrial plants of many types, in various sections of the country, from coast to coast, but this visit still holds a vivid place in my memory. I remember well the noise and confusion of a huge boiler plant; the sense of imminent catastrophe of a blast furnace, as well as of the explosives plant which I passed at a safe distance; the close organization and precision timing of an automobile assembly line; the pungent odors of a tannery and a paint and varnish factory; as well as the more agreeable odors of a toilet soap and cosmetics works, an orange-packing plant; and many others. But nowhere else did I ever experience the dramatic urgency, the deadly devotion to the task in hand, the concentrated fury of that vast army of patriotic workmen in the shipyard — the grim determination to beat the deadline, and "beat the Bosche!"

The Thrill of a Lifetime

It was a cold, gloomy, depressing winter morning. A biting salty wind blew in from somewhere out in the Atlantic, and kept overcoats buttoned and collars turned up. In the ways, one after another in an endless line, we saw ships in all stages of completion. Ubiquitous electric floodlights accentuated the shadows cast by the weird structures in the ways and on the docks. A light fog blurred the edges of the picture, and created the illusion of looking off into infinity as we were conducted along the interminable dock. In retrospect, the overpowering impact of this eerie panorama lies in the realization that in this vast undertaking we were witnessing one manifestation of the miracle of modern American technological and productive genius, that was to achieve the impossible, and amaze the world, and confound our enemies.

It was in this portentous situation that Charles R. Allen made one of his major contributions to the cause of vocational education — more specifically, industrial education. In all this beehive of activity, in one of the critical periods in the history of our country, the realization that one of the key figures, one of the indispensable figures, was an *educator* inspired a genuine thrill. This was one of the momentous occasions, which seem to arrive with increasing frequency in recent years, which generate justifiable pride in one's membership in the teaching profession.

The Skipper

Undoubtedly Allen's brilliant success in the direction of the program for training instructors for the shipbuilding industry may be accounted for by his lifetime interest in boats and boating, his rearing in an historic maritime community, and the fact that from early childhood he knew the ways of "those who go down to the sea in ships." By reason of this background, as well as because of his own personal tastes and inclination, he was able to "talk the language" of the shipbuilders, and to establish the finest kind of working relations.

Following this year of intense application in the shipyards, it was natural that there should be a tendency in conferences and public addresses to draw on these experiences for illustrations and for the clarification of many situations and problems in industrial education. Proceeding to Washington soon after the termination of his engagement with the Emergency Fleet Corporation, Allen's associates on the staff of the Federal Board for Vocational Education seized upon these unique characteristics of his experiences and personality, and began calling him "Skipper." The title was much more than a jest, and because it was so appropriate and so expressive, it stuck. And so, from the early 1920's to the close of his career, he was "Skipper Allen" to all who really knew him.

Deserved Recognition

One more episode in Mr. Allen's career remains to be described briefly, and then I bring this narrative to a close. Professional recognition is one of the potent stimulants to effort and achievement. Because of the modern emphasis on the formulas for "making friends and influencing people," we all realize the importance of the friendly and timely message to one who has just rendered some outstanding service, or who has completed some noteworthy task. And yet most of us are too enmeshed in our own spheres of action, and too busy (or we think we are), to distribute these appreciative and congratulatory messages as freely as we should, although we often acknowledge the impulse.

Anyone who is able to look back over any considerable term of years, from a favorable vantage point, must have observed how few individuals of his acquaintance have been singled out for appropriate recognition of the worth of their accomplishments. In the nature of things, elaborate and significant recognition of superior achievement cannot be bestowed frequently or indiscriminately. If it were, it would soon lose all force and meaning.

It is a pleasure to record that Charles R. Allen was the recipient of one of the outstanding expressions of esteem and good will in the history of industrial education. It was an expression, moreover, that came from his peers among the leaders in this great movement, the very ones who were qualified to evaluate the quality, the magnitude, and the significance of his contribution to the cause.

The occasion was the annual convention of the American Vocational Association, in which Allen had been active from the founding of its earliest ancestor, the old National Society for the Promotion of Industrial Education, in 1906. At the convention in Los Angeles, in December, 1927, at the annual banquet, in

the presence of an enthusiastic throng of admirers, Mr. Allen was presented with a beautifully printed booklet, "In recognition of service rendered in the cause of vocational education."[3] The book was planned and produced by a committee, the chairman of which was Dr. Robert O. Small, Allen's one-time chief in Massachusetts; and congratulatory addresses were delivered by Dr. Charles A. Prosser, Allen's one-time chief in the Federal Board for Vocational Education, and in Dunwoody Institute.

[3]Robert O. Small and Others, *Charles Ricketson Allen*. A Testimonial Brochure in Recognition of Service Rendered the Cause of Vocational Education. Prepared by a Committee of the National Association of State Directors of Vocational Education, consisting of Robert O. Small, *Chairman*, Z. M. Smith, and Wesley A. O'Leary, and presented at the annual banquet of the American Vocational Association, Los Angeles, Calif., December, 1927. Published by R. R. Donnelley and Sons, Chicago, 1928; cloth, 86 pp.

The testimonial booklet was accompanied by a bound volume consisting of several hundred personal congratulatory letters forwarded to the committee by friends, associates, and admirers representing every state in the Union and several foreign countries. All those who participated in this expression of their sentiments have the added satisfaction, as they look back upon the event that took place more than a score of years ago, of knowing that it occurred while the recipient was still living, in fact at the very pinnacle of his career, when he was able to enjoy it to the full.

(To be continued)

The Job of Teaching

HOMER C. ROSE
Falls Church, Va.

Teaching is no job for the weak, the tired, or the lazy — it is a man's job.

Although the instructor needs a thorough knowledge of the technical skills he is to teach, he must have much more than that alone. Teaching is in itself a skilled and highly specialized job requiring the personality of the salesman, the organizing ability of the administrator, the analyzing ability of the skilled mechanic, the inspiration and originality of the artist, and the psychologist's knowledge of human relations.

Teaching is a challenge to the best. It is too big a job for any but the best. A good instructor can be the most valuable man in the system — a poor instructor may be a decidedly bad risk.

A good instructor keeps the following truths in mind all of the time:

There is much pleasure and satisfaction in doing a good job of teaching, and much unhappiness in doing a poor job.

He is in a key position. If he fails as an instructor, others will fail on the job.

Knowing how to teach requires much preparation. He must prepare anew every time he meets a class.

A good instructor is always respected.

Teaching men is leading men. The instructor should be a teacher, not a "tough guy."

An instructor needs at least one hour of preparation for each class.

An instructor that wastes the time of fifteen men for thirty minutes has wasted eight man-hours.

An administrator of a training program must understand and be interested in training methods.

One instructor can influence the careers of hundreds of men — only the best should teach.

A man may have technical skill and knowledge but fail as an instructor. Teaching requires a well-balanced personality — it is no job for the misfit or the faddist.

Arts and crafts products made by students of Tucson Senior High School, Tucson, Ariz. Submitted by Harry A. Goldstein, instructor of photography
— Photograph by Ken Kemmeries

Industrial Arts and Vocational Education
John J. Metz, *Editor*

WHAT STEEL MEANS IN OUR LIVES

According to information gathered by the American Iron and Steel Institute, the industrial production of steel has risen to almost unbelievable heights. Since early March and up into August the United States steel mills were pouring over three tons of steel every second throughout the 24 hours of the day. During the year ending June 1, 1951, production of nearly one-hundred and two million tons had been reached.

Most of this enormous amount of steel was used for ordinary civilian products, thus helping America raise its living standards besides raising its national strength. It helped industrial production to rise more than 12 per cent in one year with the delivery rate of military goods increasing threefold.

The 500 million tons of steel produced during the six years after the end of World War II helped to make: 31,500,000 motor vehicles, 22,500,000 refrigerators, 19,000,000 washing machines, 23,000,000 stoves and ranges, 3,000,000 farm tractors, 5,400,000 nonfarm dwellings, 60,000 miles of pipelines, 400,000 freight cars.

The shipments of steel used for the manufacture of ordnance and other military goods, exclusive of ships and planes, rose from 3575 tons in May, 1950, just prior to the outbreak of the Korean War, to 105,000 tons in June, 1951.

Shipments for shipbuilding and aircraft almost quadrupled what was used for these purposes the year before, and equaled the amount used for other military purposes.

The raw materials utilized in the manufacture of steel also have been used in ever increasingly greater quantities. Thus steel companies used more than 119 million tons of iron ore, 92.5 million tons of coal, 62.7 million tons of coke, 34.6 million tons of fluxes, 2 million pounds of cobalt, in 1950. Sixty-seven per cent more chromium was used than in 1949. Molybdenum, nickel, titanium, and vanadium also were used in record breaking quantities.

Steel has always been an important product in the United States. Today its importance has been increased manyfold, and teachers and students of I.A.V.E. will find it exceedingly interesting to study its growth and progress from early colonial times to the present day.

THE NEW SCHOOL YEAR

Most likely your classes for 1951–52 have already started. Most likely, too, you have spent much time and energy in planning the work for this year.

It may, however, be well to check your plans, to see whether these plans contain everything you intended to put into them. Undoubtedly you have provided blueprints for the projects which are to be made this year, and no doubt you have introduced as much safety as it it possible to put into your course. Have you been equally careful to enliven your course with interesting bits of related work which you yourself have gathered and written up to fit your course?

Probably there never was a time when manufacturers and dealers were so generous in giving out information about the materials that go into their wares. In some cases the available material is much too voluminous to be used in our shops. It is usually easy, however, to boil down this related material so that it fits the needs of our pupils. Be sure to make it interesting as well as informative, and don't be sparing with diagrams and sketches. There is a reason why the comic sheets are so popular with the youth of our land. The comics are easily understood, and the explanations are clear and concise. Try to imitate them when you write your lessons.

Don't forget that lesson sheets give you a good opportunity to present many practical applications of how tools are to be used safely, and how mathematical problems which arise in your type of work can be solved. Good craftsmen know how to make use of many short cuts in solving such problems. Learn how to use them in your classes and teach them to your students. They will appreciate the practical methods, and your training will appear in a much better light to the local mechanics.

And then, don't forget that your bulletin board can help you immensely in your job of teaching industrial arts and vocational education. Industry uses many new and astonishing methods of doing certain kinds of work. Some of these new ways of accomplishing old jobs are described in trade magazines. Cut them out and place them on your bulletin board. You will find that your students will study them with great interest.

Then, too, don't forget that you will have some bare wall space that can be used for displaying large industrial blueprints. Make use of all of these methods to help your students. It will help them and make your job of teaching easier.

THE SCHOOL AND THE CRIPPLED CHILD

In an article, "Use of Toys in the Treatment of Cerebral Palsied Children" which apeared in *The Crippled Child Magazine*, Mrs. Zila Nathans, occupational therapist at the Cerebral Palsy Pre-School Center, Lenox Hill Hospital in New York, reports on a study of the use of toys for crippled children.

Her study showed that there are many toys which will be quite effective in the treatment of such children. To be effective, however, the toys must fit the child, the aims of the treatment, and arouse and hold the patient's interest.

The study also indicates that there must be a variety of toys because if the same toy is used repeatedly the child becomes bored and restless and no longer puts forth the desired effort.

A chart listing 24 toys that have been found useful in training and developing the cerebral palsied child accompanies Mrs. Nathans' article in *The Crippled Child Magazine*. The chart indicates the usefulness of each toy in relation to some of the more important aims of treatment.

The problem of making toys for these children might be of interest to some teachers of industrial arts. It might be adopted as a group or a club activity at the school and undoubtedly would arouse great interest among the students.

A crippled or an ailing child has a great appeal, and if the students of industrial arts are given a real job helping these youngsters, great benefits will be reaped by the palsied children and by the students who are trying to help them.

The Next Twenty Years in Industrial Arts

WARD L. MYERS
Editor, Pennsylvania Vocational Education News
Muncy, Pa.

Can you envisage a craft demonstration for industrial-arts students on a 6 ft. television screen? Or coeducational classes of high school students working together in home maintenance situations? Or lesson plans being made co-operatively after the classes meet? Well, don't look now but these are only a few of the changes we may expect in dynamic industrial-arts programs in the next twenty years.

From the turn of the century through the late twenties, industrial-arts education followed a pattern which largely imitated the formal European schools. The emphasis was on skills, with formal exercises on fundamental tool processes, and the ultimate objective was to produce difficult projects and skilled workers. Then the Smith-Hughes act clearly defined vocational education. This had a tendency to minimize the value of industrial-arts programs, or at best to regulate their functions as a type of junior grade vocational education. Only in recent years has the value of industrial arts been properly appreciated in its relation to vocational education.

We Will Define Objectives

The next twenty years will produce a clear definition of the work and objectives of industrial-arts education. This will not be an easy task. Perhaps in no other phase of education is there more confusion and less clarity than is found in the field of industrial education. This lack of discrimination would be understandable if it existed among those not directly concerned with vocational-industrial education. It is a fact, however, that enough disagreement exists among leaders in the various branches of the field that it is only with difficulty that the intention of the user is correctly understood.

If we are to establish readily understood and easily acceptable terms which will find general use among ourselves and with those in all fields of education, we must sacrifice the complete and lengthy examinations which literary definitions provide. Rather, we must be satisfied with the distinguishing and essential characteristics of each term which marks the logical definition. The following may be a start in the right direction:

"Industrial arts is one of the practical arts, a form of nonvocational education. It has for its purpose giving information about and experience in the use of tools, materials, and processes incident generally to the home and the manufacturing industry."[1]

We Will Establish Standards for Shop Construction

Industrial-arts shops in the past twenty years too often have resembled "Topsy" — they just happened. A decision to offer a program of industrial arts was generally followed by a search for the "least worst" room where minimum requirements could be most nearly met and which would involve no construction expense. Undersized and poorly lighted industrial-arts shops are today more common than adequate ones. Comparatively little specific information has been gathered for the use of those who must plan for the future. In order to establish standards, the first job to be done is that of collecting and organizing available data regarding desirable construction standards for industrial-arts programs. We must know more about locations, sizes, shapes, and heights of shops. We must examine and arrive at new ideas of light and power. Our present conceptions of layout, flexibility, storage areas, student comfort, and suitable construction materials need to be re-examined in the light of what is now or will be available.

Architects and school officials who plan shop construction need help such as may be found in a recent publication of The University of the State of New York, Division of School Buildings and Grounds, entitled, *A Planning Guide for Comprehensive High Schools*. This publication is concerned with vocational-industrial and vocational-technical building facilities, but is a good example of what is possible for industrial arts.

Greater Use of the Arts and Industries Laboratory

Advanced shop experiences will be provided for upper grade boys and girls in high schools through laboratories of arts and industries. Such laboratories consist of groups of industrial-arts equipment arranged in a systematic manner and aim to interweave industrial-arts experiences with academic and life experiences. In addition to the usual general shop subjects areas, we may look for more emphasis on the graphic arts, upholstery, ceramics, commercial art, photography, and stagecraft. Small communities may not be able to bear the expense of teachers and equipment for the laboratory, which may cover 8000 to 10,000 sq. ft. of floor space, but such a program may be feasible in proposed county or area schools. Measured in terms of pupil growth, exponents of the laboratory are convinced of its value.

Trend Toward Four Periods Weekly

The next twenty years will witness an increase in scheduled time for industrial arts. Both parents and students combine in this request. A recent Pennsylvania survey[2] of parents in four communities

[1] F. C. Moore, *American Vocational Journal*, Vol. 22, No. 5, May, 1947, p. 7.

[2] Made by members of North Central Industrial-Arts Association of Pennsylvania, South Williamsport, May, 1950.

revealed that they believed junior high school students should spend a minimum of four hours weekly in general shop activities. At present most communities provide no more than two periods. However, notable exceptions such as are found in the public schools of Chester, Pa., provide as much as four double periods weekly. The trend is strongly toward greater shop time.

Both Separate and Mixed Classes

The question of separate or mixed classes of boys and girls in industrial arts is one which needs more research than is available today. Without having *tried* mixed classes at various levels it is hardly accurate to say what the results would be. The traditional school schedule encourages mixed classes at the elementary level and separate classes at junior high age. Furthermore, if we believe that boys and girls of junior high age need different subject matter, then it is illogic to schedule them together for industrial arts. But anyone who has observed the natural attraction of boys to girls (or vice versa) in upper senior high and particularly in grade 12, can hardly doubt that here is a level of co-operative industrial arts which offers an educational program of exceptional realism. Such students are, in many cases, only a few years removed from the problems which they will face as homemakers. In adult life the ideal is co-operative effort. Should school classes provide the opportunity to solve problems of maintenance in a realistic manner? Forward looking school officials who specifically plan courses in household mechanics, furniture repair, upholstering, home electricity, and minor appliance upkeep will doubtless find them among the most popular and helpful studies which their school offers.

We Will Have Teacher-Pupil Planning

The years ahead will bring more teacher-pupil planning. This should increase motivation at senior high level and result in greater student interest. Teacher planning will not be reduced; in fact it requires greater preparation to supervise a student-centered program than a conventional course of study. Several class meetings are usually required to develop plans. Junior high and elementary classes will offer less opportunity for co-operative planning, but even at lower levels there will be greater flexibility of choice, with accompanying student interest and activity.

Greater Community Use

The use of industrial-arts shops by adults and out of school youth will increase in the next twenty years. Adults will be given more opportunity for expression in hobby classes and husbands and wives will come to the shops to build needed articles for their homes. Care will be needed to avoid commercialism, for school shops should avoid having articles made for sale. However many profitable home workshops may result from adult shop experiences. Community celebrations which require floats, banners, or temporary displays will use shop facilities. New shop construction should provide a street door to the industrial-arts shop in order that other parts of the school need not be open when only shop classes are in session. There will be greater need for large open areas in the shop to accommodate stagecraft, boatbuilding, and home storage projects.

The extra work required of teachers will be covered by an all-inclusive contract at a professional salary. Teachers should average $5,000 and be willing to devote extra time as is required on special occasions. Teachers who watch the clock will become rarer as salaries and qualifications are raised. Teacher training institutions will strongly continue the present trend to carefully screen candidates — particularly with regard to personality — and train a number which more nearly equals the demand than is now the case.

Industrial Arts Will Have State and Federal Aid

The present trend in school support is to provide additional funds to activities which require additional expenditures. Any subject which offers as much in equipment, supplies, and activity as modern industrial arts cannot be cheap in terms of the traditional school program.

At present no specific federal funds are earmarked for industrial arts, but some are needed, and will be provided in the next twenty years. Some states now furnish funds for the promotion of new programs, and this will continue. All states should examine their enabling acts to make sure that they provide for the fullest use of funds now available and those which will be appropriated. A good program of public relations will enable communities to offer maximum support at the local level.

The outline of the American Vocational Association for state supervision of industrial arts is worthy of increased support. Many individual teachers need the aid and reassurance which can be given by a staff of experienced industrial-arts supervisors. Occasional shop visits should not be beyond reach in any well-supervised state program. In industrial states, where the products of industry are valued at billions annually, a budget of $50,000 for industrial-arts supervision would represent about one dollar for each half-million produced. At present, some states provide more supervision for drive-in theaters and liquor stores than to industrial-arts programs.

Parents on Advisory Committees

Advisory committees have been of considerable value in vocational education. The next twenty years will bring wider use of parent-advisory committees in industrial arts. Because these committees have no administrative or legal functions, some have felt them to be unimportant. Their greatest value is to provide advice and support for industrial-arts programs. Where the committee is composed of parent taxpayers there is likely to be strong support for progressive shop policies. Parents generally want the best for their children when they are well acquainted with objectives.

Visual Aids Will Include Television

Twenty years ago the visual aids for industrial arts were extremely limited if we compare the wealth of material we have today. A few commercial charts and lesson plans usually represented the supplementary aids in general use. These have been improved and supplemented by excellent sound films, strip films, slides, models, mock-ups, and textbooks. Radio, although not a visual aid, has been employed successfully for instruction in larger cities. Television promises a method of instruction which can surpass other media in some phases of supplementary information for industrial-arts classes. Expert demonstrations in plastics, building processes, and consumer products can be made available to an entire area on a scale which no individual school program could provide. Large cities or area units will likely operate their own stations such as is now done at Miami, Fla., and elsewhere. Six-ft. screens will be used in school auditoriums.

Programs of industrial-arts education face an exciting twenty years ahead. If we gear our programs to the pace of American industry we cannot miss the boat.

PROBLEMS AND PROJECTS

A PRACTICAL 10 VOLT SUPPLY OUTLET

CHARLES W. CARLOCK

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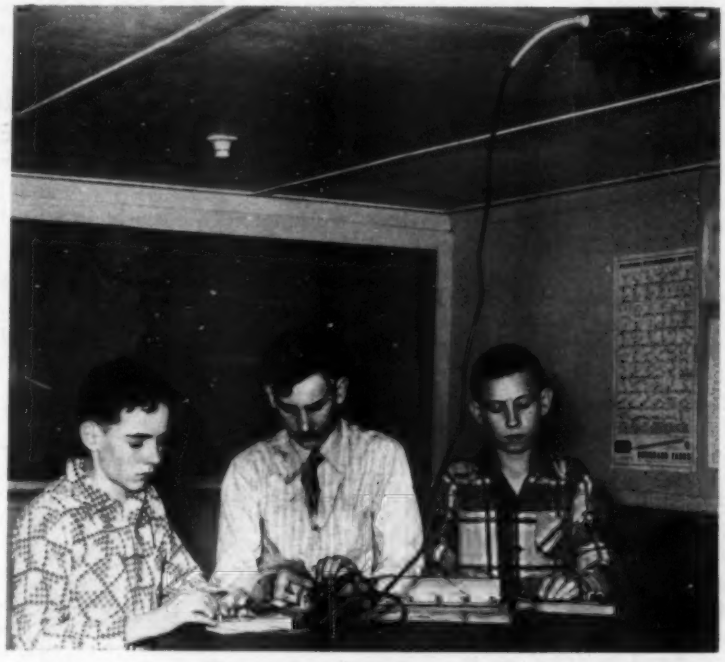
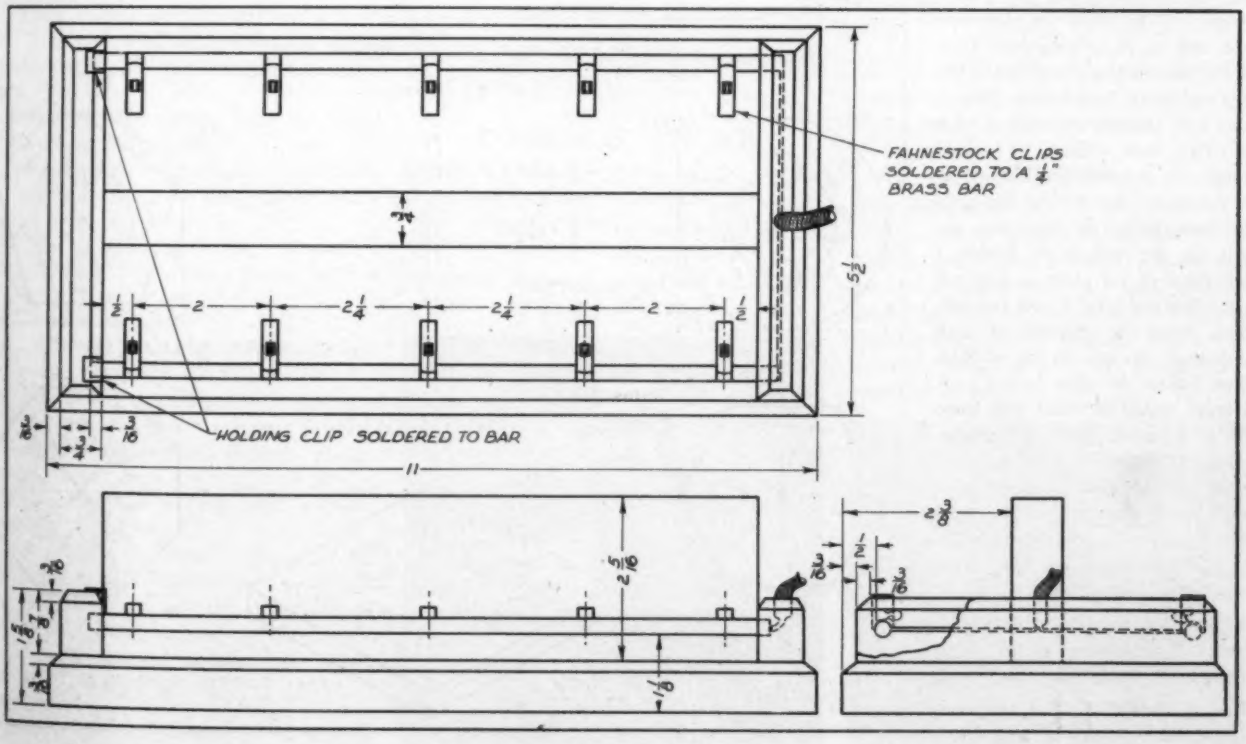
Frequently the problem of providing an adequate supply of low voltage current for the general shop electrical area is a difficult one.

A regular step-down transformer will provide enough current. However, most of them have just the two connections for any certain voltage, and often 5 to 6 students need to use one at the same time. We were able to solve this problem by using a transformer and the multiple outlet described here. The outlet is still in good condition, after three years of satisfactory service.

A regular 110-volt step-down transformer was used. Most of the transformers of this type have a multiple selection of voltage ratings in the secondary, ranging from 4 to 24 volts. We selected 10 volts as the most prac-



10-volt supply outlet in use



Details of 10-volt supply outlet

tical to use, especially for model motors. Lower voltages do not supply enough power to run many of the poorly constructed models and higher voltages will burn the insulation from the coils of the motor armature and stator.

This outlet was constructed so that six students could use it at the same time. By extending its length, more Fahnestock clips could be added, which would provide more stations. This number would be limited by the capacity of the transformer selected.

The base of the outlet, the two ends, and the divider were made of hard wood. Flathead screws inserted from the bottom held the three pieces to the base. The two bars were made of brass, but copper bars would serve just as well. These bars were held in place by 2*d*. finishing nails driven through small holes drilled in one end of each piece.

The following steps could be used in making and assembling the outlet. Lay out and drill the 5/16-in. holes in the base. These should be countersunk from the bottom. Lay out and drill the 1/16-in. holes in the divider. Fasten it to the base with No. 8 by ½-in. screws. Lay out and drill the 1/16-in. holes in the ends. After laying out, drill the ¼-in. holes, just halfway through the endpieces. One of the pieces should be drilled so the wires can be pulled through it. This end is to be fastened to the base and then the wires should be pulled through it. The wires are then soldered, one to each brass bar. Then put the bars in place and fasten the other end piece to the base. Drill a 1/16-in. hole through one end of each bar. This hole should be drilled through the endpiece and the bar in one operation. By driving the nails into these hoels, the bars will not rotate in the endpieces. Solder a small piece of tin plate to one end of each bar and bend it over the endpieces. Bend the tailpiece of each Fahnestock clip into an arc of 1/8-in. radius. Solder the clips to the bars. All holes should be filled with some type of insulator, such as beeswax.

The transformer can be mounted on the ceiling near some 110-volt outlet. Loose wires left on the outlet might cause a direct short circuit, which would burn out the transformer. The possibility of this happening during the time the shop is closed will be lessened if the outlet is connected to the light circuit.

In our project, regular two-wire, No. 14 rubber-covered electrical wire was used to carry the current from the transformer to the outlet. A 12-in. piece of BX conduit was fastened to a transformer. The sharp edges were covered with a coat of solder. This prevented these edges from chafing the wire and causing a direct short circuit. It was found that the length of lead wire needed for best results was about the distance from the ceiling to the table top.

COMBINATION PAPERWEIGHT AND PAPER SPINDLE

B. ALFRED COX
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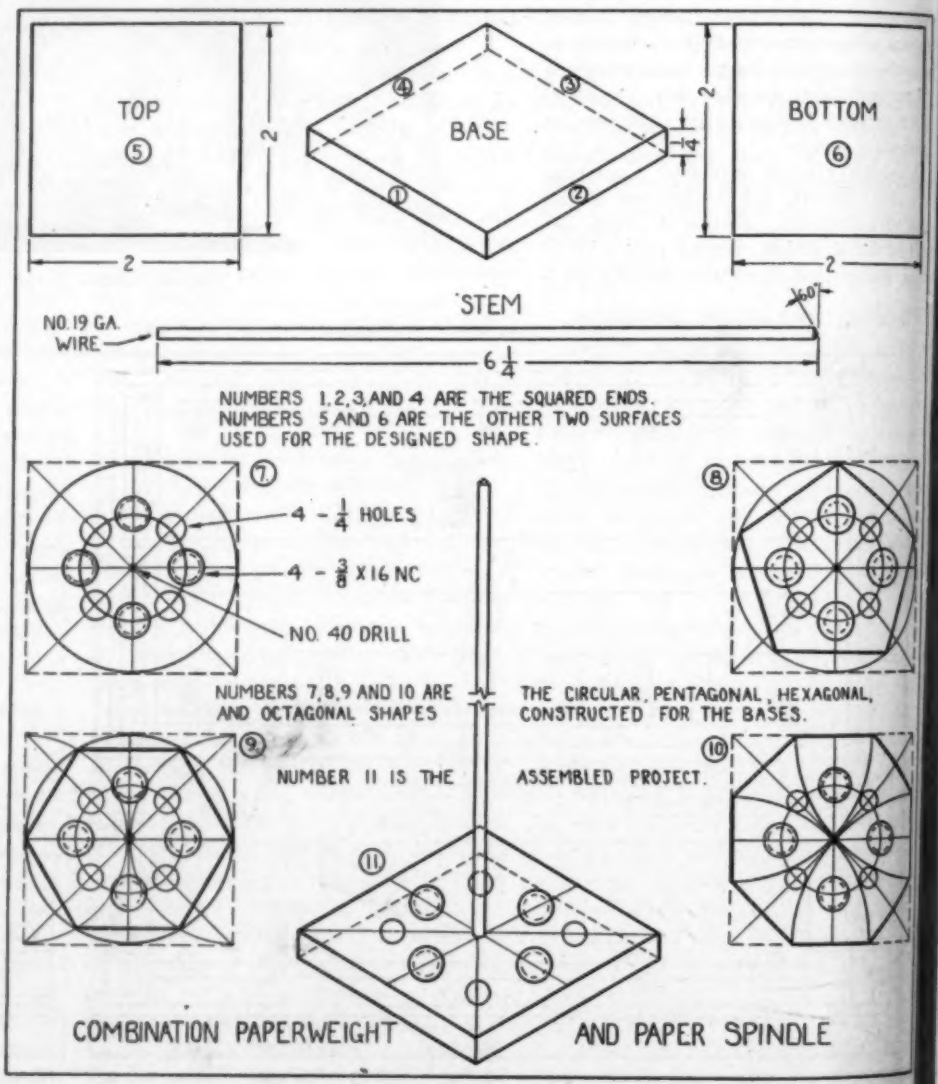
Inexpensive metal projects in benchwork for beginning vocational education and industrial-arts classes are eagerly looked for by many teachers. Frequently it becomes quite difficult to obtain metal projects possessing enough teaching and learning units, when one has a limited amount of equipment, supplies, and materials. The following job presents many fundamental hand tool operations with related theory to the beginner in machine-shop practice. Combining theory along with the construction of the project, it can be made to take any length of time desired depending upon the length of time granted a period.

This project, because of its weight, may be used to hold down paper, or it may be used for filing sheets of paper on its stem.

Materials: ¼ by 2 by 2 mild steel; No. 19 wire; ½ dowel rod; Prussian blue or white chalk; emery cloth; crocus cloth; steel wool; filings; cutting oil; pencil; eraser; notebook.

Hand tools: Steel rule; hack saw (18-tooth blade); rough double cut file; smooth single cut file; file card; 6-in. square; scriber;



Combination paperweight and paper spindle

divider; center punch; ball-peen hammer; soft hammer; drills (No. 40, 5/16 in. and 1/4 in.); set of taps (3/8 — 16 N.C. taper, plug, and bottoming); tap wrench; bench vise; soft vise jaws; small drill vise.

Machine tools: Power hack saw; bench drill press; emery wheel.

Operation Steps (Base)

1. Cut off a piece of stock from 1/4 by 2 mild steel 2 1/16 long using the power hack saw.
2. Remove all burrs.
3. Square end No. 1 with a file.
4. Square ends No. 2 and 1 with a file.
5. Apply Prussian blue or chalk on surface No. 5 close to end No. 3.
6. Lay off 2 in. on surface No. 5, from end No. 1 to end No. 3 with a square and scriber.
7. File to scribed line and square with end No. 2.
8. Lay off 2 in. on bottom surface No. 6 from end No. 2 to end No. 4 with a square and scriber.
9. File to scribed line and square end with end No. 3.
10. Remove all burrs from the four ends.
11. Apply soft vise jaws to the bench vises and drawfile surfaces 5 and 6.
12. Apply Prussian blue or chalk on surface No. 5.
13. Lay off shape of base (circular, triangular, square, rectangular, pentagonal, hexagonal, or octogonal).
14. Scribe a 1-in. circle in the center of the design cutting all scribed lines.
15. Centerpunch all intersections of circular and straight lines resulting from the 1-in. circle.
16. Drill all holes starting from the center with a No. 40 drill followed by a 5/16-in. drill on the horizontal and vertical intersections and the 1/4-in. drill on the inclined intersections.
17. Remove all burrs.
18. Tap the four 5/16-in. holes with a 3/8 — 16 N.C. set of taps.
19. Remove all burrs.
20. Hand hack saw the base along the lines to be sawed off.
21. File to the finished scribed lines.
22. Remove all burrs.
23. Emery cloth and crocus cloth all surfaces.
24. Spot-finish all surfaces with a 1/2-in. dowel rod.

NOTE: Templates for No. 13 above may be constructed from cardboard or sheet steel. The templates may be scribed around on surface No. 5 instead of making the selected design directly on the surface. This is left entirely up to the instructor.

Instructor's inspection of pupil progress may be made at any of the above 24 steps if he so desires.

Operation Steps (Stem)

1. Cut a piece of No. 19 wire 6 1/4 in. long.
2. Grind or file a 60-deg. point on one end of the piece with an emery wheel.
3. Steel wool, emery cloth, and crocus cloth the stem.
4. Place the stem in the center hole of the base.
5. Turn project in for final mark.

Learning Units

1. The names and uses of all the required tools.
2. The names of each part of the tools used.
3. How to measure accurately.
4. To learn how to use simple layout tools and perform layout operations.
5. Transfer of drafting skills to practical shop application.
6. Transfer of mathematical skills to practical shop application.
7. Use of geometric figures in the shop.
8. Simplest way to square a piece of stock.
9. How to drill holes.
10. How to tap holes.
11. The relationship of drills to taps.
12. How to finish metal surfaces with a file.
13. How to make decorative finishes on metal surfaces.
14. Use of basic simple machines — power hack saw, bench drill press, and the emery wheel.
15. The importance of following instructions.
16. The importance of observing safety rules in the shop.

CONTINUITY TESTER

JOHN V. ADAMS
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New York City

When a button is pressed and a bell rings, or when a switch is turned on and a lamp is lighted, our senses of hearing or sight tell us that electricity is at work. One may perceive the effects of electricity when it produces phenomena such as magnetism, heat, various rays, and chemical action. All these effects are made possible by electric current flowing in a path which is continuous.

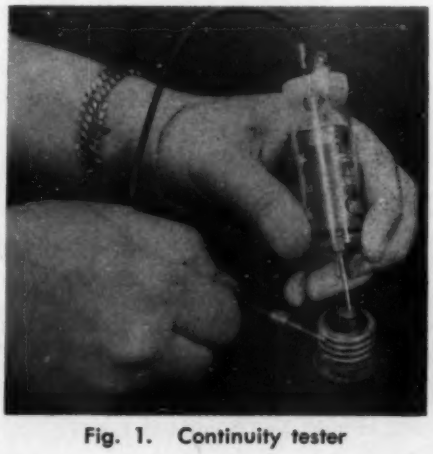


Fig. 1. Continuity tester

The importance of a continuous electrical path has led industry to produce elaborate and costly testing equipment, some types of which are called continuity testers. These testers are made in many forms and sizes; however, all of them have in common a source of power and a signaling device to indicate a continuous circuit.

The continuity tester shown in Figure 1 was designed to utilize inexpensive and easily obtainable material. The tools and processes used are elementary, and it may be easily constructed by junior high school students. It is a very convenient device for testing such common household equipment as fuses, line cords, and other units of low resistance.

Materials

10 inches of No. 22 hard rolled brass spring wire
18 inches of rubber covered test lead wire
1 phone tip
1 insulated solderless phone tip
1 insulated phone tip jack
1 1½-v. flashlight bulb
1 1½-v. flashlight battery, size C.
1 piece of brass spring strip 1 by 1/8 No. 22 gauge
1 No. 8–32 by 1¼-in. brass machine screw and No. 8–32 brass nut
1 plastic vial, 1 in. inside diameter by 3 in. in length (may be obtained in a drugstore)
Solder and soldering paste

Tools

Hand drill, drills, long nose pliers, side cutting pliers, screw driver, scratch awl, soldering copper, mill file, and vise.

Procedure

Cap Assembly

1. Locate the centers of the holes with the point of the scratch awl on the center marks making a center hole just deep enough to guide the drill to the correct location. Remember that you are working with a plastic material; it cannot be center punched in the ordinary manner.

Fig. 3. Parts required for the cap

2. Place the cap, bottom-side up on a wood support. Drill the holes as indicated in Figure 4. Use an R drill for the bulb hole and a ¼-in. drill for the phone jack hole.

3. Sweat solder the brass spring strip to the phone tip jack lug. Form to shape with the long nose pliers, as shown in Figure 5.

4. Make the bulb-battery spring connection by winding about 10 turns of No. 22 brass spring wire on a ¼-in. rod. Bend an offset in the center portion, as shown in Figure 5, to prevent short-circuiting the bulb.

Fig. 2. Parts required to make the continuity tester

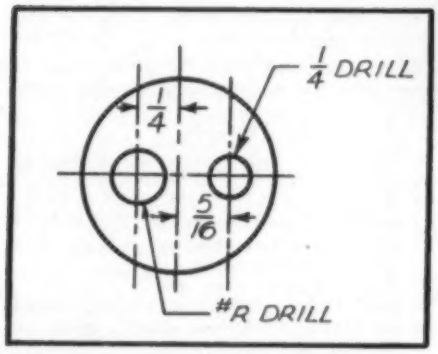


Fig. 4

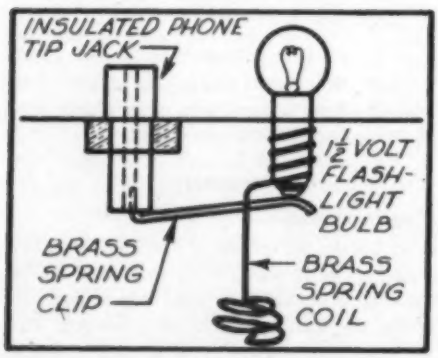
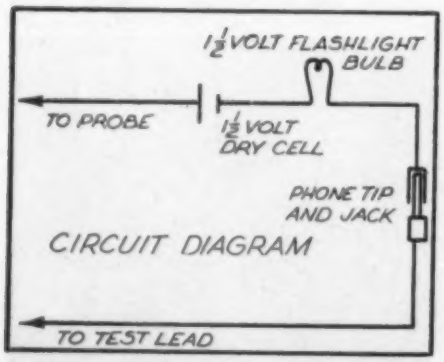


Fig. 5



Wiring diagram for continuity tester

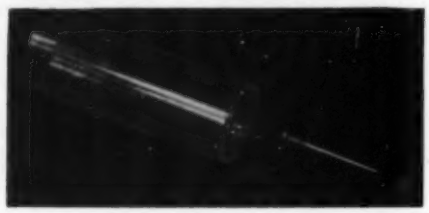


Fig. 6. The plastic vial

5. Screw the bulb into the cap hole. Screw on the bulb spring coil.

6. Screw the phone tip jack into the ¼-in. hole. Lock it into position by tightening the nut on the inside of the cap. Adjust the brass spring strip so that it makes a firm contact with the bottom of the lamp base.

Case Assembly

1. Drill the probe hole in the bottom of the vial, with the No. 28 drill.

2. Screw the nut tightly against the head of the screw to protect the threads. Clamp the nut in a vise, and file the taper for the probe on the screw. Polish with emery cloth.

3. Remove the brass nut. Insert the probe through the inside of the case. Screw it through the tight-fitting hole. Lock the probe in place with the No. 8–32 brass nut.

Lead Assembly

1. Strip the ends of the test lead wire about 5/16 in. from the ends. Twist the strands closely together.

2. Dip the ends into flux, and tin them.

3. Apply a small amount of flux to the inside of the phone tip, and drop a small piece of solder into the fluxed hole. Hold the phone tip with pliers, and apply the hot copper to the phone tip until the solder is seen to flow inside. Insert the wire while the solder is in the molten state, and apply downward pressure to the wire, making sure that the insulation enters the phone tip about ⅛ in.

4. Install the insulated solderless phone tip on the other end of the test lead.

Assembly

1. Install the flashlight battery with the positive terminal down to contact the probe screw head.

2. Press the cap on the case.

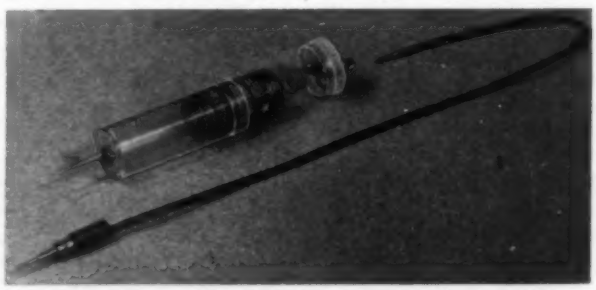


Fig. 7. The tester ready to be assembled

Fig. 8. The assembled continuity tester

3. Check the cap assembly contacts and make any necessary adjustments.

Check the tester by contacting the phone-tipped test lead and the probe. The lighted bulb will show whether the tester has been correctly made.

IT IS EASY TO RECOGNIZE GRAPHIC ARTS PROCESSES

R. RANDOLPH KARCH
Pittsburgh, Pa.

It's easy to recognize the graphic arts process used to print a job, merely by looking at the type under a good, strong magnifying glass! All students of printing, advertising, and journalism should know these few simple facts about recognizing the manner in which any matter has been reproduced by letterpress, offset lithography, or gravure.

Advances in all three processes have made them highly competitive, and the quality of work has been made better and better in the past few years.

Many printed jobs have been produced by gravure and offset lithography that were formerly produced by letterpress. Gravure is not only represented by the Sunday newspaper supplements; many advertising pieces of all descriptions, magazines like *Collier's*, sections of books and college annuals, and other matter are now being gravured.

A few simple, telltale features seen through two- or three-power magnification bring out the following characteristics of each graphic arts process as illustrated here:

The sample at *A* is a magnification of the gravure process. It is easily identified by the irregular edges formed by the *screening* of the type in the gravure process. *All* type is screened in gravure. Dots formed by the screen are seen easily in the accompanying illustration, especially in the hairlines of the letters.

The sample at *B* shows a magnification of the offset-lithographic process. Offset lithography is generally not so clearly defined as the letterpress type shown at *C*. Offset is generally more gray than letterpress, although not *always* so. Unless produced by the Intertype Fotosetter, the offset type is usually thicker in the serifs (note the cross lines at the top of the main strokes of the letters on the offset and letterpress samples shown in the samples *A* and *B*). Offset has an *even* color, often slightly grayed, throughout all letters in the type matter.

Very fine vignettes (illustrations in which the picture fades away into the whiteness of the paper) printed on *rough* paper stocks are indicative of the offset process, although this is true also of sheet-fed gravure on good paper stock. In letterpress this is practically impossible.

The sample at *C* is a magnification of the letterpress process. It is sharply defined *if well printed*. Under a strong magnifying glass, it will be noted that the edges — the *extreme* outlined edges — are almost always black, and usually a very slight *grayed line* is clearly noticeable close to the *extreme* edges, as illustrated. This phenomenon apparently is produced by a sucking action of the type on the ink as it leaves the paper after making the impression.

Bodoni 135
fgrhjRM*fgkyw*

Bodoni 135
fgrhjRM*fgkyw*

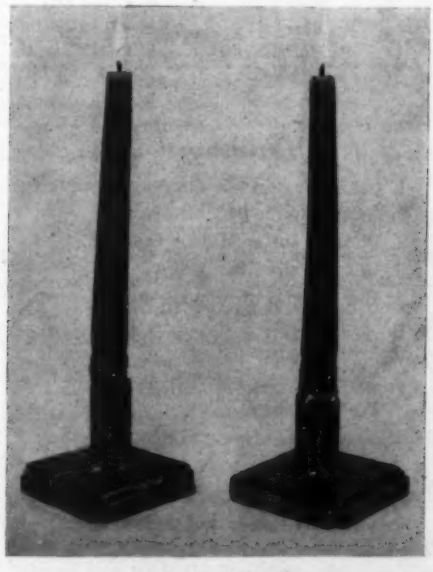
Bodoni 135
fgrhjRM*fgkyw*

Enlargement of a sample made by the offset-lithographic process

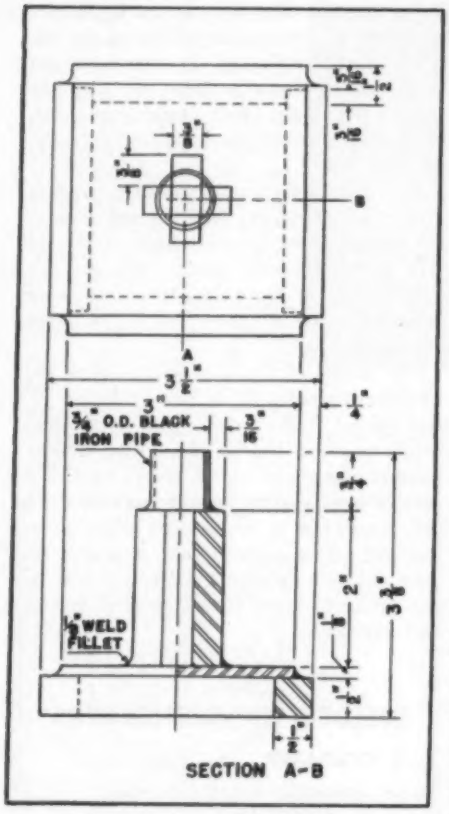
WELDED CANDLEHOLDERS

R. J. COLTHARP
Head, Industrial Arts Department
Memphis State College
Memphis, Tenn.

The unusual surface enrichment of the candleholders pictured here is due to a slight overburning of bronze welding rods, the antique bronze effect achieved serving both as fusing and as decorative agents. The materials used were of mild steel, thoroughly peened on all exposed surfaces. No attempt was made



Metal candleholders



Metal candleholder

to form perfectly smooth welds; it was found that a slight puddling effect was desirable, and that different shades of brass could be secured by uneven heating of the welds and surfaces.

Bill of Material — One Pair

No. of pieces	*Name*	*Size*
8	Foot pieces	1/2 x 1/2 x 3 in.
2	Base	1/8 x 2 1/2 x 2 1/2 in.
8	Upright	1/4 x 1/4 x 2 in.
2	Pipe holder	3/4 O.D. x 3/4 in
	Bronze welding rod	1/8 in.

Procedure

1. Cut foot pieces to dimensions, mitering at 45 deg. the inside half of each end.
2. Peen all surfaces to be exposed.
3. Cut and peen flat base.
4. Cut uprights to dimensions and peen 3 faces.
5. Cut and peen pipe.
6. Assemble and weld foot pieces.
7. Weld flat base to foot.
8. Assemble and weld uprights together.
9. Weld uprights to base.
10. Weld pipe in place.
11. Carefully spread and puddle welds with low torch heat, intentionally highlighting flats and corners with continued heat.
12. After cooling, buff all exposed parts thoroughly on a wire wheel, followed by buffing on a cloth wheel.
13. Lacquer and hand rub.
14. Apply flocking or soft cloth on base to protect furniture on which holders may be used.

MAKE-UP KIT

W. A. LERNER
Superintendent, Public Schools
Arlington, Neb.

The make-up kit in our school replaces a former shoe box container for make-up materials. The present kit can be locked and only the director has the key for it. This eliminates students leaving tubes uncapped, jars upset, and the general loss of materials.

The kit contains a mirror and sound effects — doorbell and telephone in removable tray. The prompter seated in the wing area can place the tray on his lap and manipulate sound effects very easily. This eliminates someone else forgetting to ring the bell or the telephone, something that has happened to the best of producers of high school plays.

The kit proved quite a hit with teachers of dramatics at the One Act Play Contest in our East Central Nebraska Conference held at Herman, Neb., on March 20, 1951.

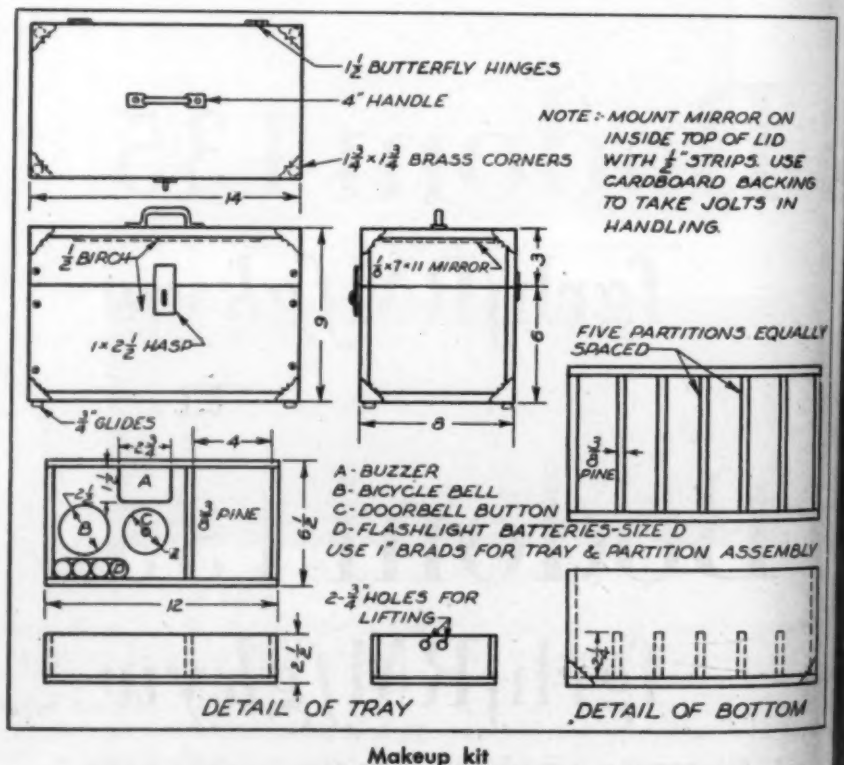
Make-up kit

I hope that we can share our idea with other shopmen who in turn will please their teachers of dramatics and make for the important "esprit de corps."

MAKE-UP KIT

Dimensions

Width	8"	Depth	9" (closed)
Length	14"	Depth	3" (lid)
Tray	1/4" (fir plywood)		
Length	11 1/2" (outside)		
Width	6 1/2" (outside)		
Depth	2 1/2" (outside)		



Makeup kit

Make-up kit

Materials

Birch	½" x 6" (bottom) and (lid ends)
Birch	¼"
8	1½" copper corners
4	¾" glides
1 pr.	2" copper hinges
1	11" copper corner bracket
1	2½" diameter bicycle bell
4	Size D flashlight batteries
1	2" push button
1	1½" x 2¾" buzzer
1	⅛" x 7" x 11" mirror
1	1" x 2½" hasp set
1	Padlock
30	#10 ⅞" f.h. screws (for assembly)
1	4" copper handle

Approximate cost, $6.50

A PRACTICAL PROBLEM FOR THE DRAFTING AND MATHEMATICS CLASSES

ANDREW G. LOFGREN
and
DAVID E. ROSENGARD
Boston Technical High School
Boston, Mass.

This problem was first devised in a drafting class at Boston Technical High School under the title of "Triangles in Combination." Its purpose is to teach accurate use of triangles and T square in combination. To motivate their work, students are told that they, upon completing the problem with their drafting instruments, will figure to the nearest thousandth of an inch an exact mathematical solution in the mathematics class. Immediately, pupils are challenged to work to a high degree of accuracy on their drawing boards to arrive as closely as possible to the correct mathematical answer. This requires sharp pencils, excellent line technique, neatness, and effective use of accurate instruments.

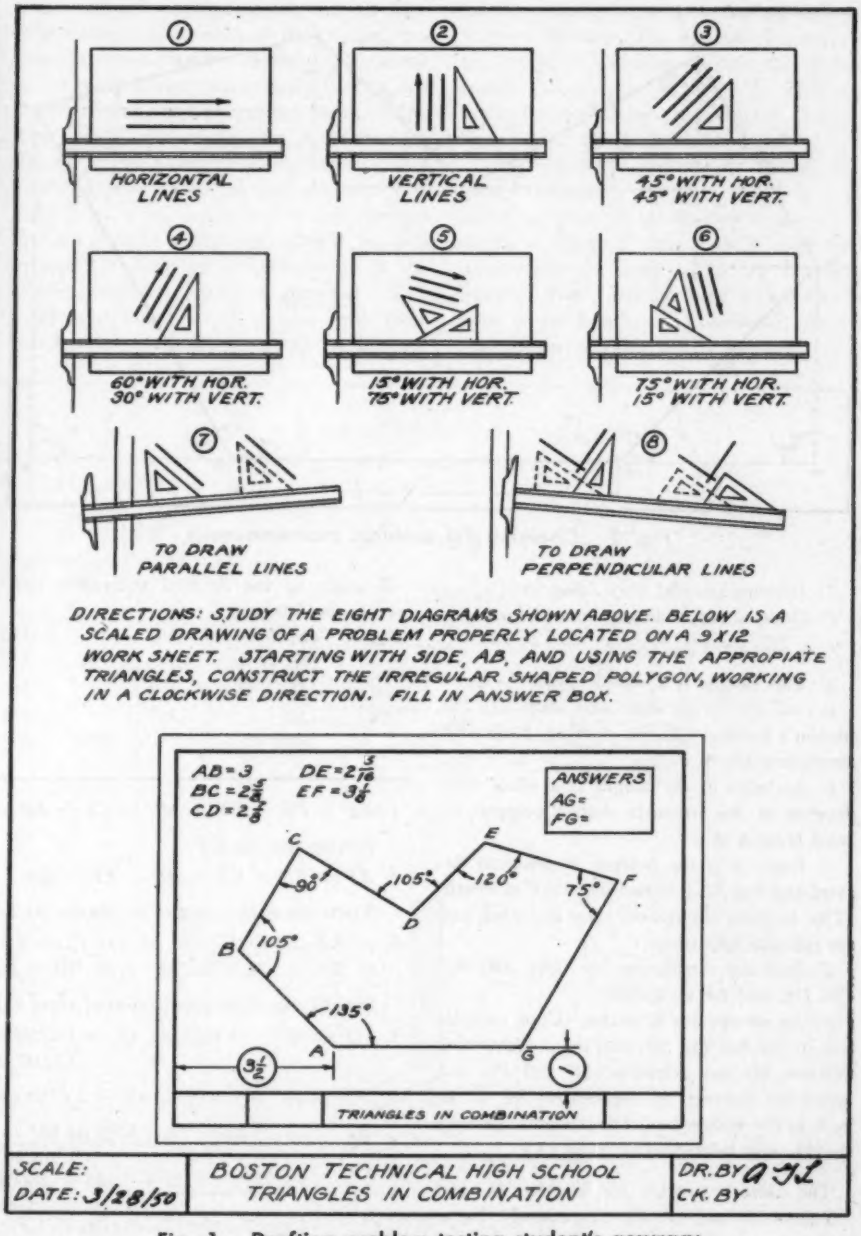


Fig. 1. Drafting problem testing student's accuracy

In presenting the problem in the drafting room, the 8½ by 11-in. instruction sheet, shown in Figure 1, is used. Such an instruction sheet for each student will save much time for instructor and pupils. Once the principles set forth have been demonstrated, the blackboard sketches may be erased, and the pupils referred to their instruction sheet.

An analysis of the instruction sheet reveals the following three sources of information.

1. Directions for students

"Study the eight diagrams shown here. Below is a scaled drawing of a problem properly located on a 9 by 12 work sheet. Starting with side *AB* and using appropriate triangles, construct the irregular shaped polygon working in clockwise direction. Fill in the answers."

2. Diagrams illustrating the principles required in the solution of the problem.

a) Drawing horizontal and vertical lines (diagrams 1 and 2).

b) Triangles in combination with the T square (diagrams 2, 3, and 4).

c) Combinations of the two triangles employed with the T square (diagrams 5 and 6).

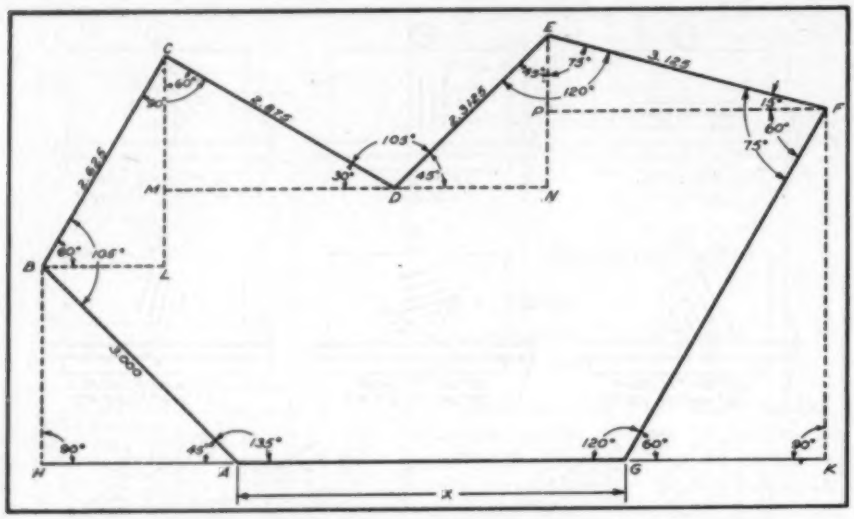


Fig. 2. Checking the problem mathematically

d) Drawing parallel lines (diagram 7).

e) Drawing perpendicular lines (diagram 8).

3. A sample of the problem

a) This sample is a scaled model (⅜ in. = 1 ft.) of a 9 by 12 sheet and looks like the student's finished full size drawing. NOTE: All dimensions are in inches.

b) Included in the sample is a small scale drawing of the irregular shaped polygon labeled from *A* to *G*.

c) Point *A* in the polygon is definitely located and line *AG* is drawn indefinite in length. (The locating dimensions are encircled and are full size dimensions.)

d) Full size dimensions for sides *AB*, *BC*, *CD*, *DE*, and *EF* are given.

e) An answer box is shown. (Upon completion of the full size polygon, the student must measure his line segments *AG* and *FG* and insert his answers, to the nearest 1/32 of an inch, in the answer box. The students' answers should carry tolerances of ± 1/64 in.)

The correct answers for lengths *AG* and *FG* are 4.150 and 4.369 in. respectively. Naturally, the drafting student cannot work in thousandths of inches; therefore, some degree of tolerance or error must be allowed. Much depends upon the school grade in which this problem is to be employed and how much previous drafting the students have had. In a Technical High School such as Boston Technical where the students are required to take drawing each year, the seniors should be expected to work to tolerances of ± 1/64 in. for all fractional dimensions. This is the tolerance which is carried on most drawings for fractional dimensions in the drafting industry. It is the tolerance or allowable degree of error for the workman and therefore safe to assume that the draftsman can work this close if he has to.

A study of the decimal equivalent chart reveals the following:

9/64	.141		.167		.370
	.146	11/64	.172	3/8	.375
	.151	23/64	.359		.380
5/32	.156		.365		.385
	.162			25/64	.390

AG = 4.150″ (math. solution)

In the chart, the closest fractional dimension to .150″ is 5/32″

Therefore $AG = 4\frac{5}{32}'' \pm \frac{1}{64}''$

FG = 4.369″ (math. solution)

In the chart, the closest fractional dimension to .369″ is 3/8″

Therefore $FG = 4\frac{3}{8}'' \pm \frac{1}{64}''$

Should this problem be employed by ninth or tenth graders, a more liberal tolerance or degree of error may be used.

The determination of the lengths of the line segments *AG* and *FG* offers on excellent opportunity to correlate the work of the mathematics and drawing classes. The construction of the diagram on the drawing board requires some arithmetic; conversely, the mathematical solution demands a careful sketch before any analysis or computation can be performed.

The fact that it is possible to compute the lengths of the missing line segments mathematically should exert on the drawing student a great urge to construct his figure with unusual care. On the other hand, the student of mathematics will want to see whether his calculations will verify the results of exact construction. There is no need for artificial motivation in such a problem; the opportunity to

1. $KF + PE - EN + MC - CL - BH = 0$

Solving this for KF:

2. $KF = EN + CL + BH - PE - MC$

From the right triangles we obtain the following expressions for the lines of equation (2):

3. *a*) $KF = FG \sin 60°$ *c*) $CL = 2.6250 \sin 60°$ *e*) $PE = 3.1250 \sin 15°$
b) $EN = 2.3125 \sin 45°$ *d*) $BH = 3.0000 \sin 45°$ *f*) $MC = 2.8750 \sin 30°$

Simplifying after substitution of these values into equation (2) we have:

4. $FG \sin 60° = 2.3125 \sin 45° + 2.6250 \sin 60° + 3.0000 \sin 45° - 3.1250 \sin 15° - 2.8750 \sin 30°$

5. $FG \sin 60° = 5.3125 \sin 45° + 2.6250 \sin 60° - 3.1250 \sin 15° - 2.8750 \sin 30°$

6. $FG = \dfrac{5.3125 \sin 45° + 2.6250 \sin 60° - 3.1250 \sin 15° - 2.8750 \sin 30°}{\sin 60°}$

7. $FG = \dfrac{5.3125 \times .70711 + 2.625 \times .86603 - 3.125 \times 0.25882 - 2.875 \times 0.5}{0.86603}$

8. $FG = \dfrac{3.7565 + 2.2733 - 0.8088 - 1.4375}{0.86603}$

9. $FG = 4.369$

To find the length of *AG* we consider the horizontal distances in the same way:

10. $HA + AG + GK - FP - ND - DM - LB = 0$

11. $AG = FP + ND + DM + LB - HA - GK$

12. *a*) $FP = 3.1250 \cos 15°$ *d*) $LB = 2.6250 \cos 60°$
b) $ND = 2.3125 \cos 45°$ *e*) $HA = 3.0000 \cos 45°$
c) $DM = 2.8750 \cos 30°$ *f*) $GK = 4.369 \cos 60°$

13. $AG = 3.1250 \cos 15° + 2.3125 \cos 45° + 2.8750 \cos 30° + 2.6250 \cos 60° - 3.0000 \cos 45° - 4.369 \cos 60°$

14. $AG = 3.1250 \cos 15° + 2.8750 \cos 30° - 0.6875 \cos 45° - 1.744 \cos 60°$

15. $AG = 3.1250 \times 0.96593 + 2.8750 \times 0.86603 - 0.6875 \times 0.70711 - 1.744 \times 0.5$

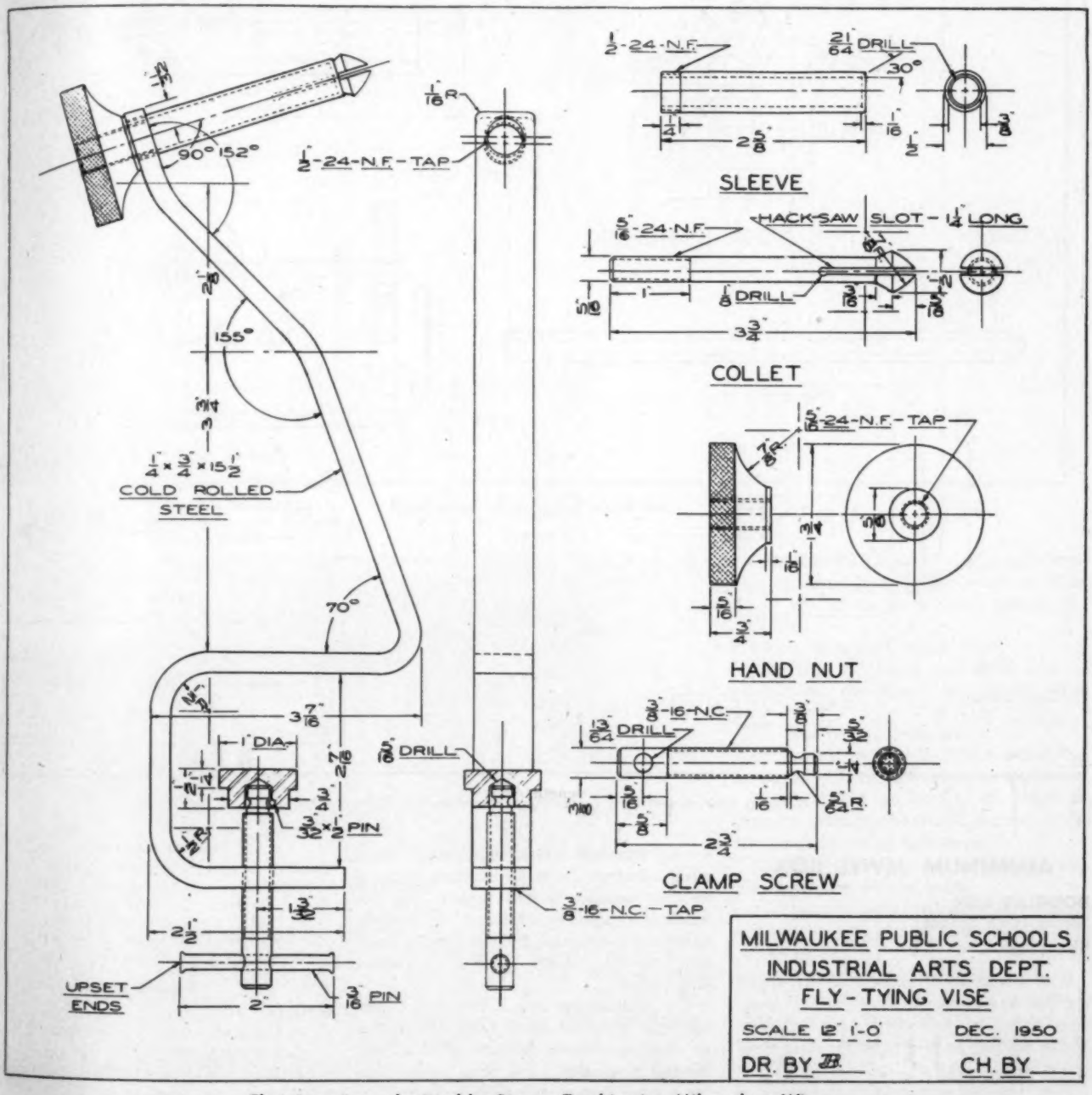
16. $AG = 3.0185 + 2.4898 - 0.4861 - 0.872$

17. $AG = 4.150$

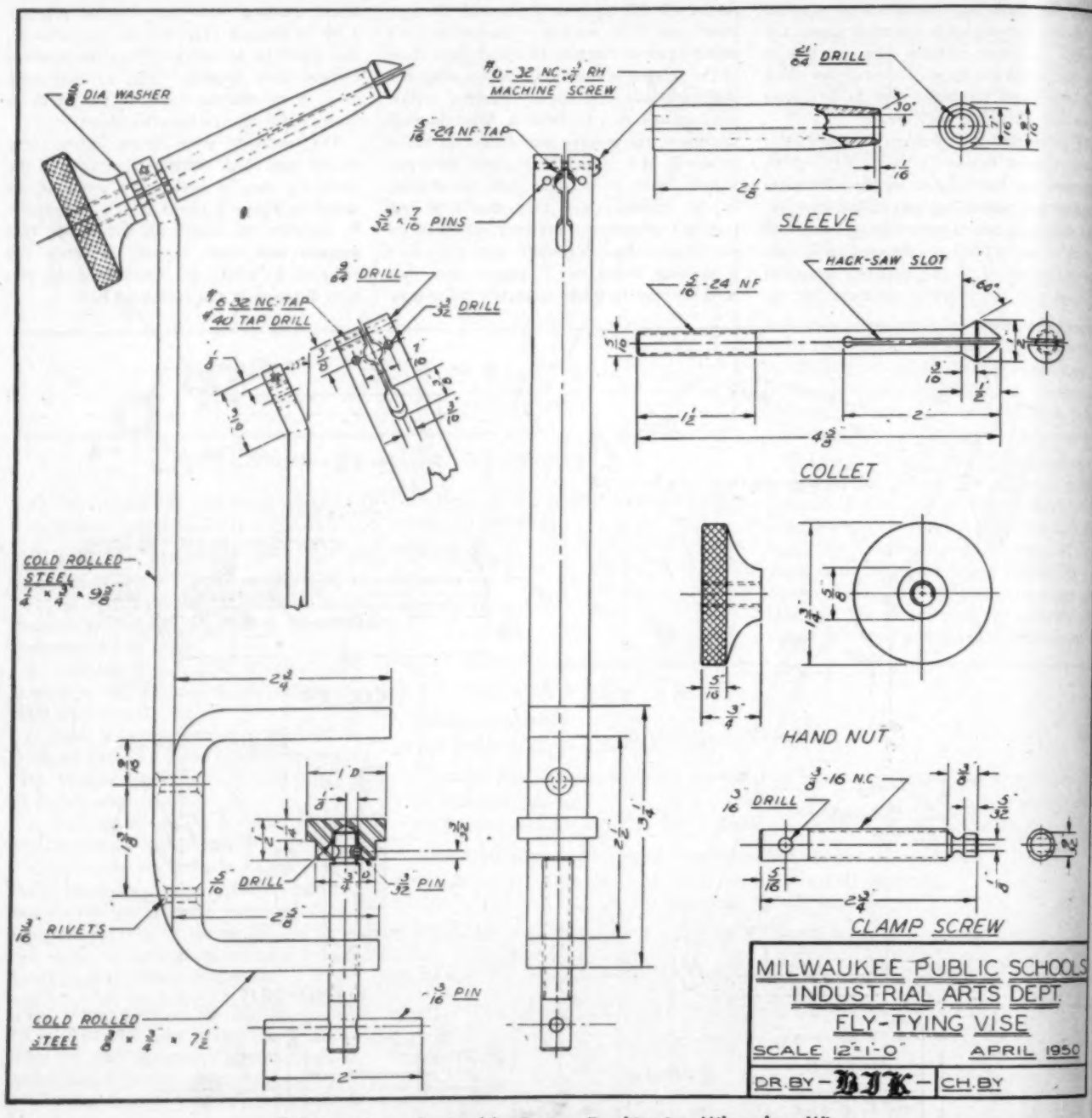
check the work in both directions provides all the interest needed to stimulate almost any student. A single problem like this one is worth a half-dozen impractical examples which leave the pupil wondering why he is solving them and what good they are.

In presenting this problem in the mathematics class at Boston Technical High School, emphasis has been placed on the advantages of making a careful analysis of the work before doing any actual computation. Almost all students are inclined to plunge directly into the evaluation of all the unknown quantities at hand with the youthful optimism that the pieces will fall together at the end. Of foremost value in an analysis of the problem is a drawn figure or diagram. In studying the shape of the polygon in question, students must first determine into what shapes (triangles, rectangles, squares, etc.) to divide it. After thorough discussion, the polygon was divided as shown in sketch M-1. Since the students have previously made an accurate full size drawing in the drafting class, they should be well prepared to make an accurate sketch in the mathematics class. Naturally, they won't have a drawing board or T square, but their sketches may be made accurately by triangulation, working from their finished full size 9 by 12 drawing (Fig. 2). An alternative to this would be as follows: Have the students convert their drawings (Fig. 2) that were made in the drafting room, to the sketch in Figure 1 for the mathematics class.

The treatment given below follows very closely that which would be developed in the surveying class. A preliminary study of the sketch in Figure 2 shows that it is desirable to calculate the length *FG* first, since that segment must then be used to obtain the value of the length *AG*. Considering the vertical distances in this sketch we have:



Fly-tying vise, submitted by Roman Tomkiewicz, Milwaukee, Wis.



Fly-tying vise, submitted by Roman Tomkiewicz, Milwaukee, Wis.

ALUMINUM JEWEL BOX

DOUGLAS COX
Senior High School
Bloomington, Ill.

With a substantial amount of eye appeal plus the introduction of many of the operations found in sheet-metal work, this aluminum box may be used either for sheet metal or art metal work.

Since bending, in one form or another, is a very important operation in many sheet-metal industries, the major emphasis is placed on this operation in this project. The lid, which is completely fabricated by bending, introduces a somewhat different type of problem from that usually found in the school shop project.

The small amount of materials (our classes use scrap which we obtain from a local shop at about one-fourth the cost of sheet aluminum) make this a low price project that has a great deal of *take-home* value.

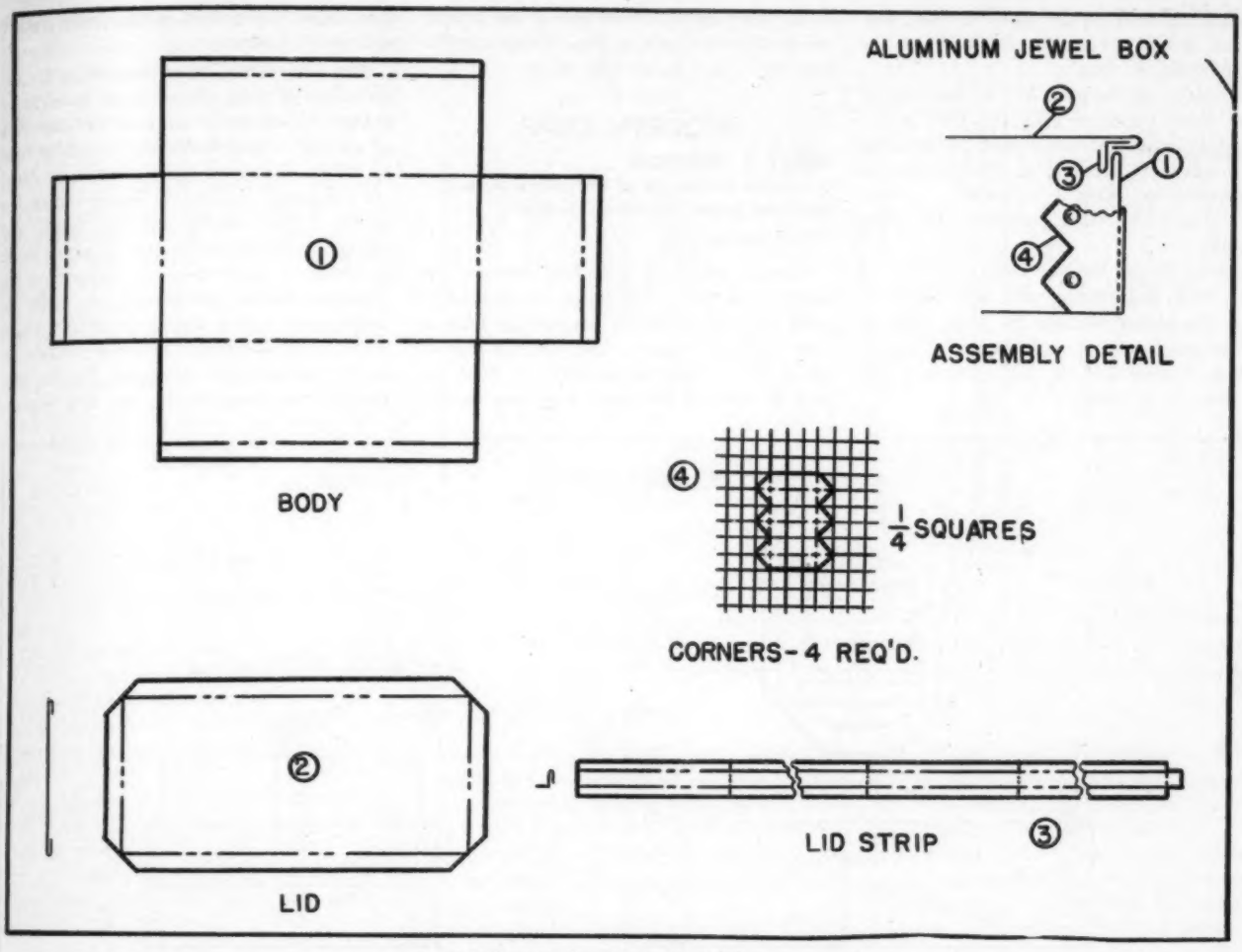
BILL OF MATERIAL

Quantity	*Name*	*Material*	*Size*
1	Body	.032 Aluminum	6¼ x 8¾
4	Corners	.032 Aluminum	1¼ x 1½
1	Lid	.032 Aluminum	3½ x 6
1	Lid strip	.032 Aluminum	⅝ x 15¾
24	Rivets	Aluminum	⅛ d. x ¼ lg.

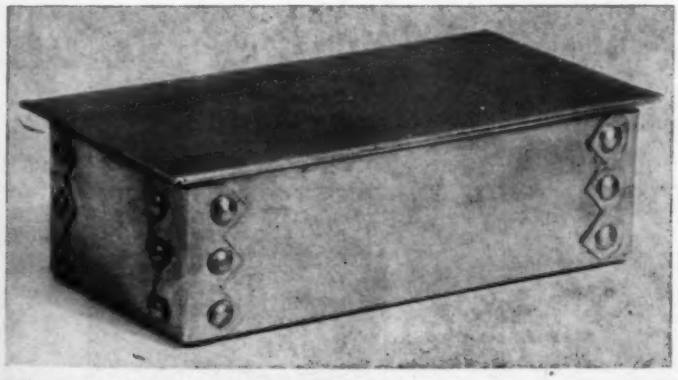
Procedure

Body:

1. Lay out pattern on aluminum.
2. Cut metal with tin snips.
3. Bend the four required ¼-in. single hems on the top edges of the box.



Details of aluminum jewel box



Aluminum jewel box

4. Crease two short bends on a stake, if a box and pan brake is not available. Bend in the same direction as the hems so that hems go inside (see assembly detail).

5. Bend long bends to 90 degrees.

6. Finish bending short bends on a stake to 90 degrees.

Corners:

7–8. Same as 1 and 2.

9. Drill or punch six ⅛-in. holes as required.

10. Bend corners to right angles along center lines.

Lid:

11–12. Same as 1 and 2.

13. Fold the required ¼-in. single hems through about 150 degrees on three sides. Leave one of the ends flat or unbent.

Lid Strip:

14–15. Same as 1 and 2.

16. Trim tab slightly so that it may be tucked into the opened end of the single hem.

17. Bend 3/16-in. single hem.

18. Turn piece over and bend second 3/16-in. bend to 90 degrees forming an angle strip.

19. To permit the bending of corners on the angle strip, the horizontal member of the strip must be cut at each corner.

20. Bend angle strip at each corner with the single hem on the inside.

21. Open the end of the single hem slightly and tuck the tab into it. Lock together with center punch.

Assembly A: Corner pieces to Body

1. Place one of the formed corners in place on the body of the box and mark one set of three holes through the holes in the corner piece.

2. Drill or punch ⅛-in. holes.

3. Rivet with ⅛ by ¼-in. flathead aluminum rivets placing the flat head of the rivet inside the box.

4. Mark the location of the other set of three holes, punch or drill, and rivet as before. (Be sure that the corner is drawn up tight when the location of these holes are determined and made.)

5. Finish the other corners in the same manner.

Assembly B: Lid Strip to Lid

6. Slide the formed strip into the lid.

7. Finish setting down the ¼-in. hems on the lid which were partially formed to permit sliding of strip into the lid. (This can best be done on a brake.)

8. Bend the unformed end of the lid and set down as in Operation No. 13 and assemble step No. 7 to complete the lid.

MODERN LAMP

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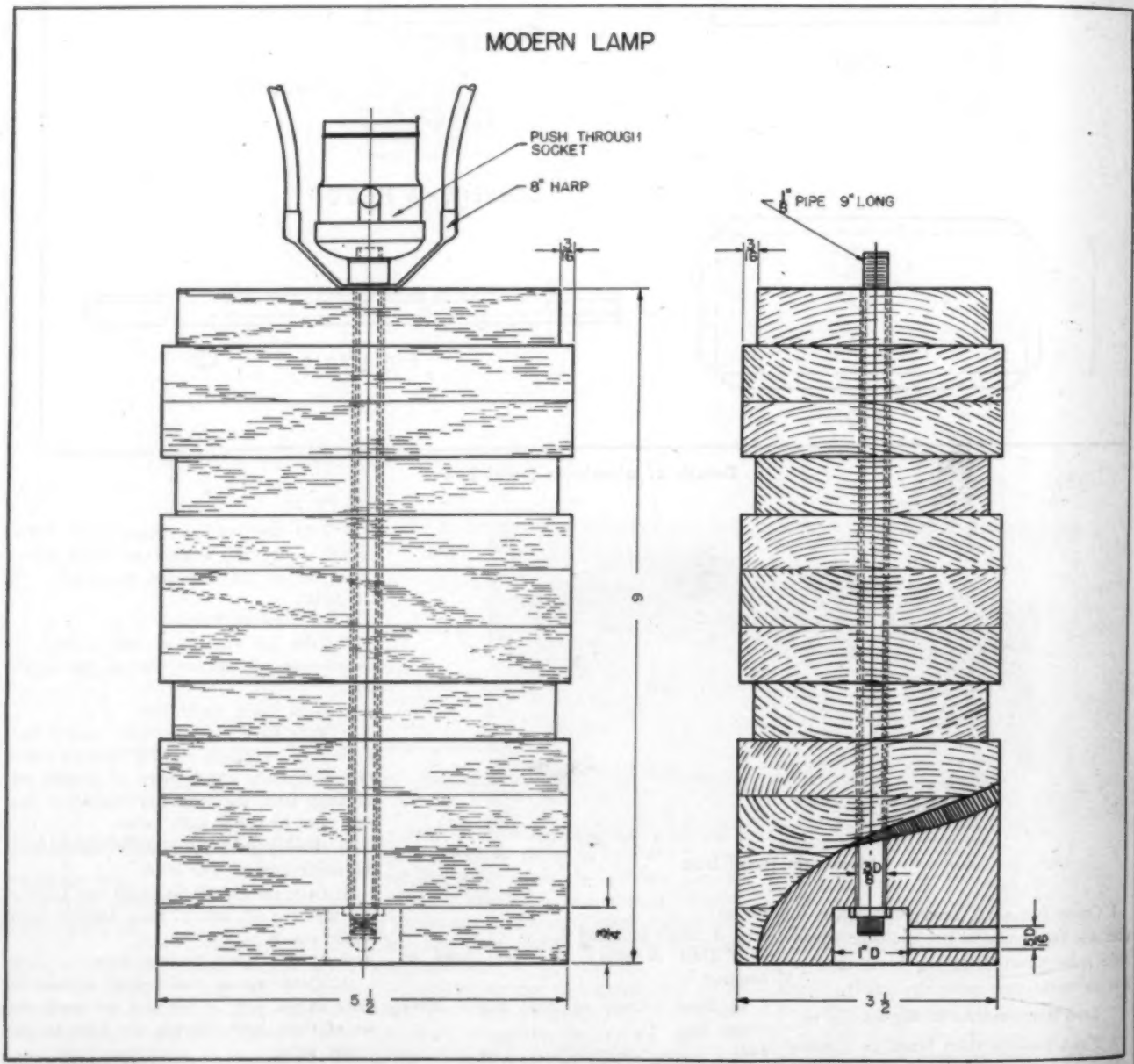
General shop and woodshop teachers frequently find their *scrap* boxes full of assorted odds and ends of wood that are too little to use for most projects and yet too big to throw away. These scrap pieces of wood can well be used in the making of this modern lamp which has proved to be a very popular and useful project.

This lamp offers many possibilities for the utilization of scrap pieces. It can be made by gluing up a number of pieces of the same kind of wood of various thicknesses. It can be made by using a variety of kinds of woods of different thicknesses, placing the darker and thicker woods at the bottom and the lighter and thinner woods at the top. Or, it can be made by using a dark wood of uniform ¾ in. thickness, walnut for example, to make the larger parts, and a similar thickness of light wood, such as cherry or maple, to use as spacers between the dark parts. The last suggestion has proved to be the most popular



Modern lamp

when a natural finish is used. A modern rectangular shade, approximately 9 in. high by 8½ in. wide and 12 in. long, can be purchased or it can be made by using coat hanger wire for the frame and making the covering of drawing paper.

BILL OF MATERIAL

No. of Pieces	*Kind of Material*	*Name of Part*	*Size of Part*
9	Walnut	Base	¾ by 3½ by 5½ in.
3	Cherry	Base	¾ by 3⅛ by 5⅛ in.
1		Threaded pipe	⅛ by 9 in.
1	Steel	Nut	⅛ in. — 27 threads to inch
1	Brass	Harp	8 in.
1	Brass	Socket, push through	Threaded cap, 27 threads to inch
1	Bakelite or plastic	Two prong outlet plug	Standard
6 ft.	Parallel lamp cord	Cord	No. 18 gauge wire

Procedure

1. Lay out and carefully saw each part to size.
2. Plane and sand edges and ends smooth.
3. Lay out and drill ⅜-in. hole through center of all but one piece.
4. Lay out and bore 1-in. hole through center of one piece, this becomes the bottom piece.
5. Lay out and drill 5/16-in. hole from center of one edge of bottom piece to meet 1-in. hole in piece.
6. Carefully glue up, face to face, four large pieces, three large pieces, and two large pieces.
7. Sand smooth the edges and ends of these glued up blocks.
8. Glue one small piece on top and the other two between blocks. Hold all parts securely in place by inserting threaded pipe in center holes and tightening nuts in place.
9. Sand top of lamp smooth.
10. Apply desired finish to lamp base.
11. Remove nut from threaded pipe at top of lamp, mount harp and fasten securely in place with socket cap.
12. Insert lamp cord through base outlet hole and through pipe.
13. Tie underwriter's knot, attach wire to socket binding posts and assemble socket.
14. Attach outlet plug to end of lamp cord.

PLASTIC BOOK ENDS

JAY A. BORDEN
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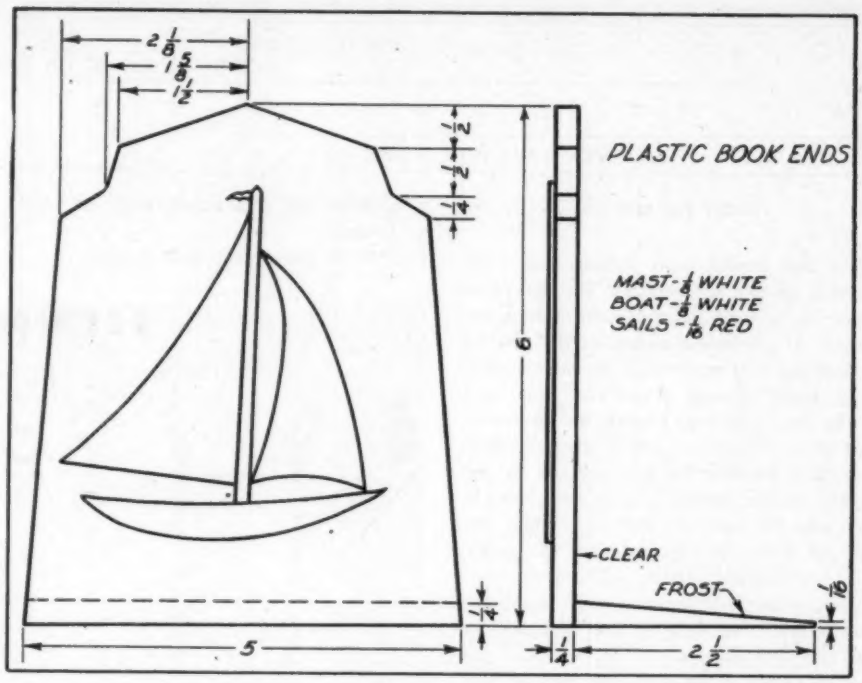
This is a very popular project in our shop because of its utility and reasonable price. Many variations of the shape of the book ends and the design used may be worked out by the individual student. One of the variations that is used considerably is a flat backpiece with a horseshoe cemented to it with a silhouette of a horse's head in the center. It is suggested that full size patterns be made and finished in colors as near those selected for the job. We correlate the making of the designs with the art department and it has been an aid to the work of both departments.



Plastic book end

The construction is simple. Some type of jig will be necessary to hold the base piece

Plastic book ends

at the proper angle to the upright while the cement is drying. In cementing the parts together, the backpiece is laid on a full size pattern of the drawing, and the mast is cemented first. (Suggest Du Pont's H-94 or methylene dichloride.) Brushing the cement on will make satisfactory joints. Exercise care so that the cement will not show along the edges when the pieces are placed in position. Order of cementing the parts is the mast, hull, jib, mainsail, and flag. The sails may be heated and curved slightly to give the effect of wind in the sails.

Flags are cut from scrap pieces of the color planned. If the flag is cut out with a fine jeweler's saw it will make the finishing of the edges much easier. When cementing the base piece to the upright, if the cement is applied by soaking it will give a clear and stronger joint. The bottom is sanded with No. 4/0 sandpaper with even strokes in one direction, giving the effect of frosted glass and the marks or scratches that appear with use on the bottom of the plastic will not show to any extent.

HOLDER FOR MODEL TOOL BITS

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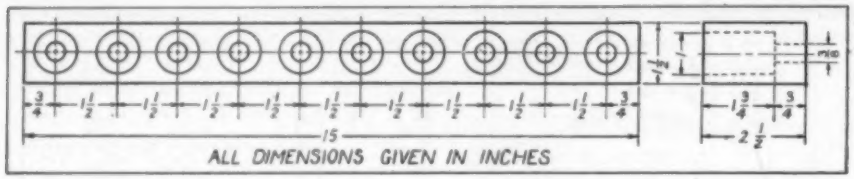
The need for some kind of a convenient holder for model tool bits located at the grinder in the machine shop has long been experienced by many shop teachers. It becomes more evident when we realize that there are some eight or ten common cutting tool bits used by the beginning student in machine shop work. This tool-bit holder (and teaching aid) was designed to prevent the misplacing of the model tool bits that are so often scattered around the grinder in the machine shop. In this holder each tool bit has a place and can easily be dropped into its proper hole.

Various tests of different sizes and weights of materials were used before we found a



Holder for tool bits

chain that would drop through the holes without twisting and knotting. The type chain (pull chain) used and the ⅜-in. hole in the bottom of the holder eliminates the twisting or knotting that one usually encounters when using string or sash chain. The ⅜-in. hole in the bottom is large enough and so located that the screw eye will always enter this hole, making it possible for the tool bits to rest evenly on the bottom of the 1-in. hole. In this way the tool bits form a straight line and are always the same height in the holder.

The outstanding feature of this design is its simplicity resulting in ease of construction and practicability. By using ten feet of pull chain cut into five equal parts, we will have two feet of extension for each tool bit and have only one foot of chain hanging down from each tool bit. The chain and connectors used are commonly referred to as pull chain and pull chain connectors, and can be purchased at most hardware stores. Connectors may also be secured from the ends of pull cords that come with pull type electrical switches, or may be taken from the chain key rings found in the ten cent stores.

BILL OF MATERIAL

No. of Pieces	*Material*	*Size*
10	wood — poplar	⅝ x ⅝ x 3 in.
1	wood — poplar	1½ x 2½ x 15 in.
1	pull chain	10 ft.
10	screw eyes	small
10	metal — connectors	small

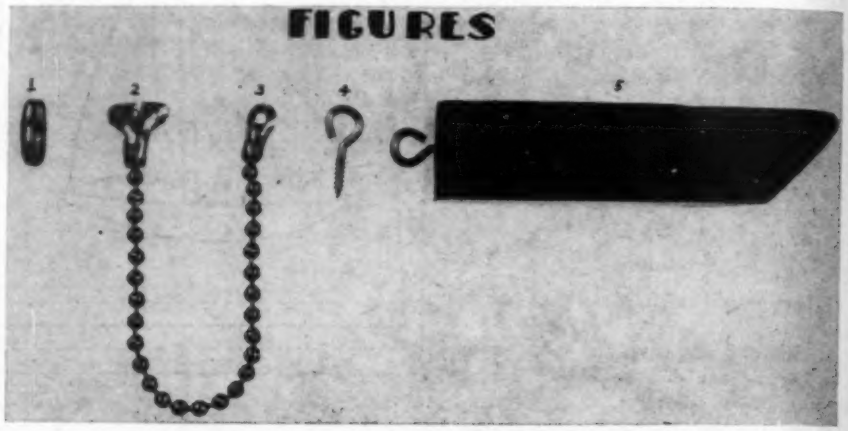
Finishing Materials: White shellac, varnish, steel wool, No. 0 sandpaper, and small amounts of black, gray, and red enamel.

Suggested Plan of Procedure

1. Cut ten pieces of poplar ⅝ x ⅝ x 3 in.
2. Plane each piece square and true; sand smooth.
3. Lay out lines on each piece for desired shape of model tool bit.

NOTE: See "How to Run a Lathe," published by South Bend Lathe Works, South Bend, Ind. In this case there will be one each of the following named tool bits: round nose, left hand roughing, right hand roughing, left hand turning, right hand turning, left hand facing, right hand facing, standard V threading, acme threading and brass or soft metal turning tool.

4. Cut and sand each piece on disk sander to shape desired.
5. Apply a thin coat of white shellac.
6. When dry, rub lightly with fine steel wool.
7. Paint body with black enamel.
8. Paint clearance surface gray and rake surface red.
9. Drill 1/16-in. hole in square end for screw eye.
10. Drive screw eye in each tool bit (Fig. 5).
11. Cut chain into 2-ft. lengths (5 pieces).
12. Place one connector on each end of the five pieces of chain (Figs. 2 and 3).
13. Flatten out the end of each connector (Fig. 2).



Figs. 2, 3, 4, and 5. Parts of tool-bit teaching aid

Method of using tool-bit teaching aid

14. File corners of this flattened end round (Fig. 3).
15. Center punch and drill hole in center the size of the screw eye stock (Fig. 3).
16. Cut poplar stock for holder 1½ x 2½ x 15 in.
17. Plane stock square and true; sand smooth.
18. Lay out on the 1½-in. surface of the holder for 1-in. diameter holes down the center lengthwise.
19. Lay out centers for ten 1-in. holes, 1½ in. on center, the center of the first hole to be ¾-in. from the end.
20. Drill ten 1-in. holes 1¾ in. deep.
21. Drill ⅜-in. hole in center of each 1 in. hole.
22. Sand true and smooth removing all pencil lines.
23. Apply a thin coat of white shellac.
24. When dry, rub lightly with fine steel wool.
25. Apply a coat of varnish or paint if desired.
26. Drop chain through the ⅜-in. holes from bottom side of the holder.
27. Open screw eye enough to slip through small hole in connector.
28. Place connector in screw eye and close with pliers.

An excellent article on how to make a "Tool-Bit Gauge" may be found on page 205 of the 1950 May issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine. This gauge would be an excellent addition to this teaching aid.

KITCHEN STEP STOOL

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and
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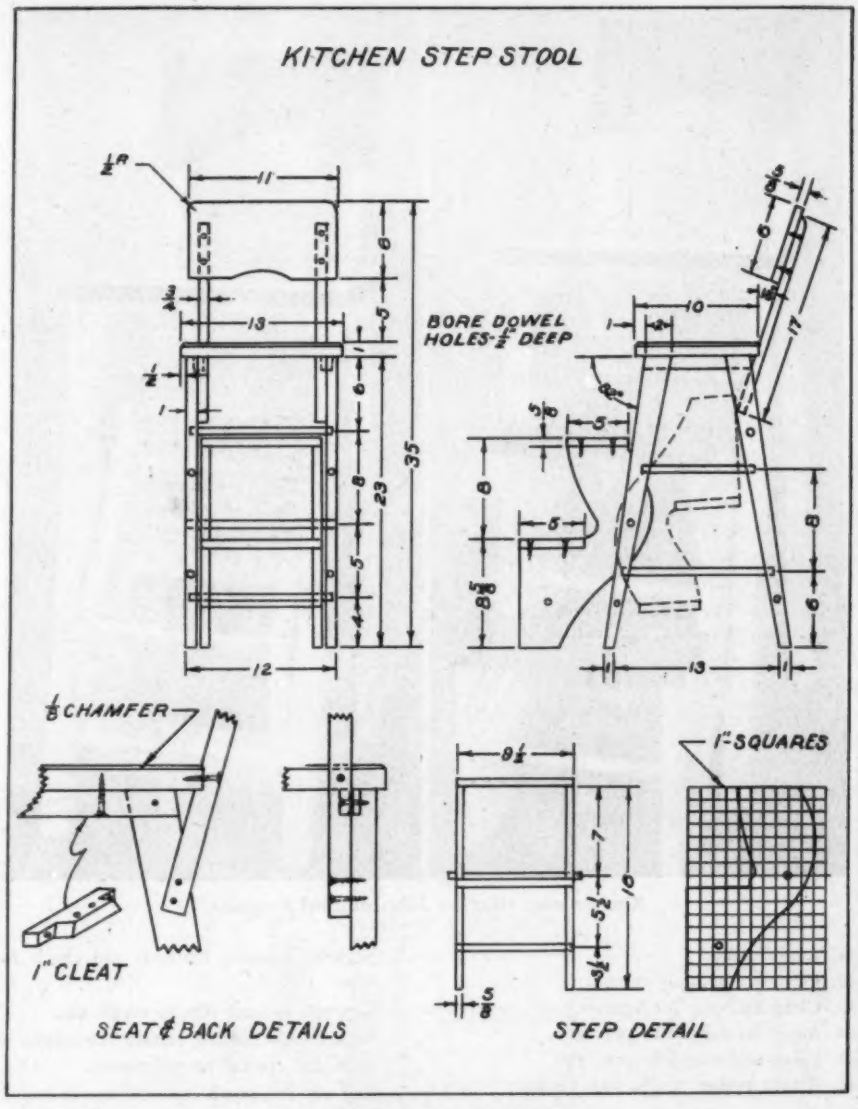
The kitchen step stool described in this article may be used as a beginning woodworking project on the college level. Experience has shown that students regard this as an interesting and useful project which may be used in the kitchen as a stool or a small ladder. An analysis of operations shows that the project contains a large number of basic manipulative processes which should be covered in a beginning woodworking course.

Analysis of Operations

1. Read a working drawing or blueprint.
2. Make out a bill of material.
3. Make a detailed plan of procedure for doing a job.
4. Secure and check material.



Kitchen step stool

5. Measure and divide spaces with a bench rule.
6. Lay out a pattern on stock.
7. Lay out an irregular design by means of squares.
8. Check the layout.
9. Lay out curves with compass or dividers.
10. Gauge with a pencil.
11. Gauge with a marking gauge.
12. Assemble and adjust a jack plane.
13. Plane a surface true and smooth.
14. Plane an edge square with surface.
15. Plane end grain.
16. Proceed properly in squaring a board.
17. Test for squareness with try square.
18. Saw to a line with crosscut saw or ripsaw.
19. Saw to a line with backsaw.
20. Saw inside and outside curves with jig saw.
21. Trim or pare with a chisel.
22. Make a notch joint.
23. Drill holes in wood.
24. Countersink holes.
25. Bore holes with auger bit.
26. Lay out and cut chamfers.
27. Lay out and cut tapers.
28. Check bevels with T bevel.
29. Make an edge to edge glue joint.
30. Lay out duplicate parts.
31. Sharpen edge tools.
32. Sharpen cabinet and hand scrapers.
33. Smooth a surface with a scraper.
34. Smooth a surface with sandpaper.
35. Sand edges and ends.
36. Fasten with screws.
37. Hold stock with hand screw clamps.
38. Prepare glue.
39. Clamp and glue work.
40. Apply plastic wood filler over screw heads.

Kitchen step stool by Johnson and Simpson

41. Apply shellac.
42. Prepare and apply enamels.
43. Clean and care for brushes.
44. Apply lacquer with spray gun.
45. Clean and care for spray gun.
46. Attach rubber treads with cement.

BILL OF MATERIAL

No. of pieces	*Name*	*Material*	*Size*
1	Seat	Maple or birch	1 x 10 x 13 in.
4	Legs	Maple or birch	1 x 2 x 23 in.
2	Step sides	Fir plywood	⅝ x 10 x 16 in.
2	Steps	Maple or birch	⅝ x 5 x 9½ in.
2	Back braces	Maple or birch	¾ x ¾ x 17 in.
1	Back	Maple or birch	⅝ x 6 x 11 in.
2	Cleats	Maple or birch	1 x 1 x 9 in.
1	Front dowel hinge	Maple	⅝ dia. x 12 in.
3	Front and back dowel rungs	Maple	⅝ dia. x 11 in.
1	Step rung	Maple	⅝ dia. x 9½ in.
2	side dowel rungs	Maple	⅝ dia. x 12 in.
2	side dowel rungs	Maple	⅝ dia. x 10 in.
10	F.h. steel wood screws		No. 8 x 1¾ in.
16	F.h. steel wood screws		No. 8 x 1½ in.

Plan of Procedure

1. Study blueprint.
2. Make out a bill of material.
3. Secure necessary material and check for size.
4. Lay out and cut legs to rough size.
5. Square legs making certain the angles at each end are cut to dimensions.
6. Lay out and rough cut sections for seat.
7. Joint two edges for glue joint.
8. Locate, mark, and bore holes for dowels.
9. Glue and clamp dowel joint for seat.
10. Square seat to finished dimensions.
11. Lay out and cut chamfer on seat.
12. Lay out and bore holes to proper depth for dowel rungs on legs.

NOTE: Use Forstner bit to bore holes; be sure holes are laid out on the insides of legs and bored at the correct angle and depth.

13. Locate and bore holes on front legs for dowel rod which hinges the step section to stool.
14. Cut dowel rungs for the legs and step sections.
15. Make trial assembly of legs and dowel rungs.
16. Lay out and cut cleats to fasten seat to legs.
17. Locate, drill, and countersink holes in cleats.
18. Attach cleats to legs with screws and attach top to cleats with wood screws.
19. Lay out by means of 1-in. squares pattern for sides of step section.
20. Transfer patterns to stock.
21. Locate and bore holes in sides for dowel rod braces.
22. Cut sides of step section.
23. Square steps to finished dimensions.
24. Locate, drill, and countersink holes in steps for mounting steps to sides.
25. Cut dowel rod braces to length.
26. Assemble step section.
27. Lay out and cut braces for back rest.
28. Lay out and cut back rest.
29. Locate, drill, and countersink screw holes for attaching back braces to stool seat and legs.
30. Attach braces to seat and legs with wood screws.
31. Attach back rest to braces.
32. Disassemble all parts.
33. Smooth all rough surfaces and edges with a hand or cabinet scraper.
34. Rough sand all parts with No. 1/2 garnet paper.
35. Apply glue to all parts to be glued.
36. Assemble all parts and apply necessary clamps.
37. Remove excess glue before it hardens.
38. Fill all exposed screw head holes with plastic wood filler or wood plugs.
39. Finish sand entire project with No. 2/0 garnet paper.
40. Apply a coat of shellac.
41. Rub lightly with No. 4/0 garnet paper.
42. Spray one or two coats of colored lacquer undercoater.

(If a natural finish is desired, use a prescribed procedure for securing such a finish and omit the following steps.)

43. Rub lightly with No. 6/0 garnet paper.
44. Spray several coats of desired color lacquer.
45. Trim edges of seat and step surfaces with desired color of enamel.
46. Cement a thin rubber tread to step surfaces.

ECCENTRIC BORING HEAD FOR MILLING MACHINE

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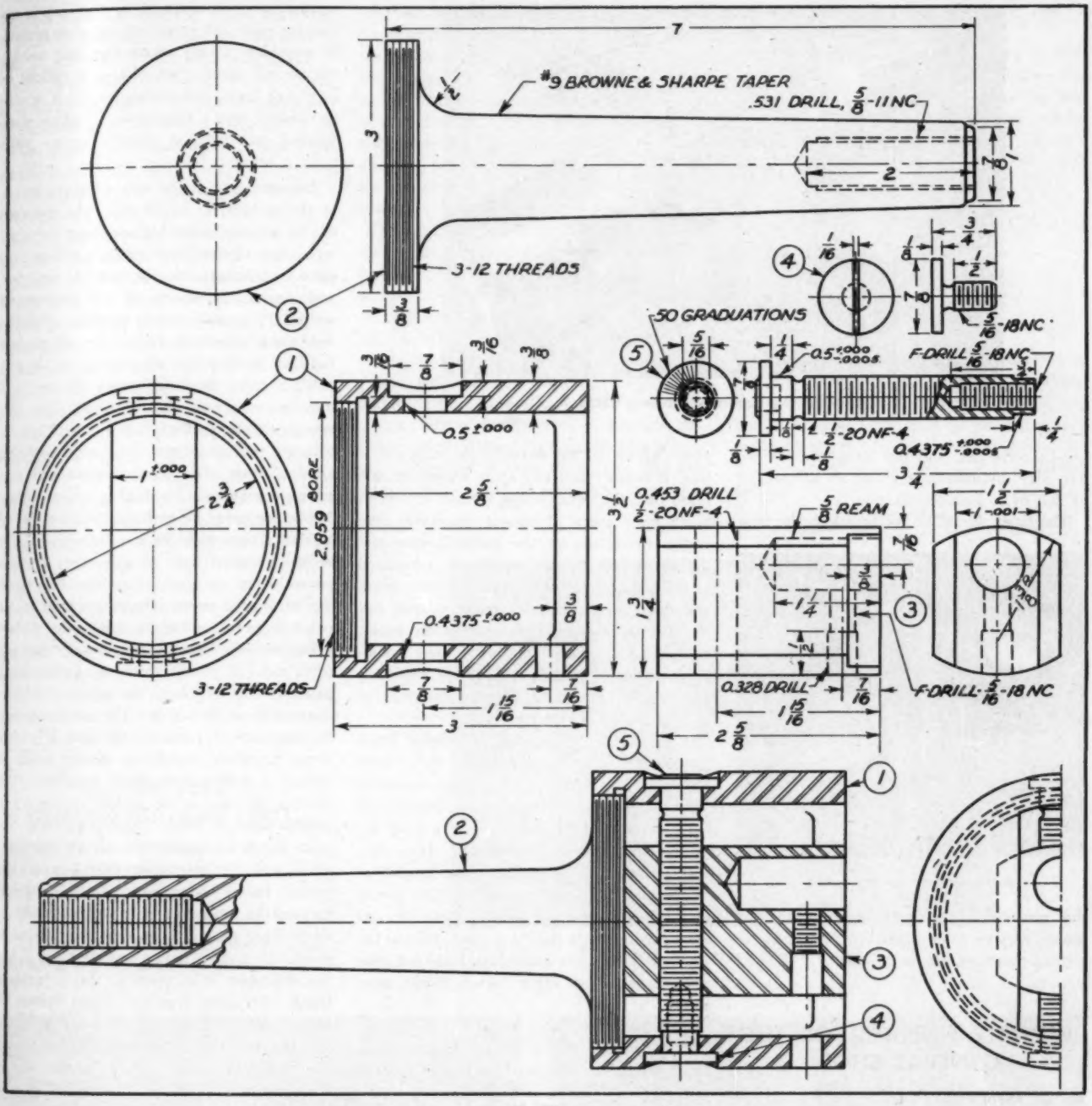
George Washington High School
Indianapolis, Ind.

A useful addition to your machine shop tools is an eccentric boring head for the milling machine. Making this tool provides an interesting challenge for an advanced machine-shop student. The step-by-step procedure fol-

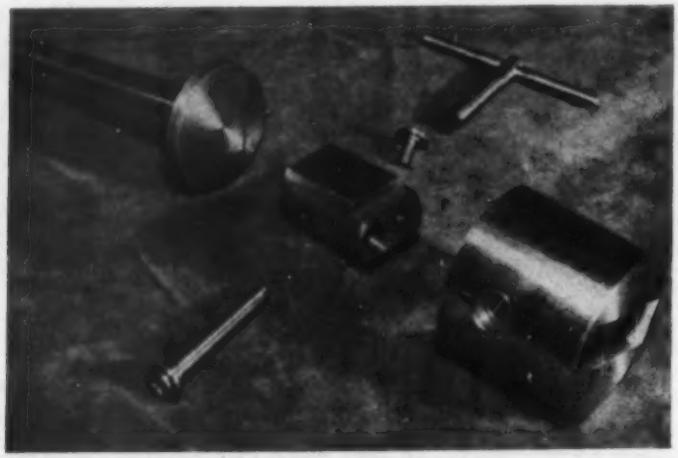


Details of eccentric boring head for milling machine

lowed in machining this project is given as follows:

1. Chuck up stock for the body, Part 1, and bore to size.
2. Cut threads in body.
3. Rough stock out for shank, Part 2, leaving shank straight, taper to be cut later.
4. Cut threads on shank.
5. Assemble the body and shank, and chuck up dead true for turning body.
6. Turn outside of body to finished size.
7. Reverse the assembled piece in chuck, indicate dead true and cut taper on the shank.
8. Drill and tap hole in end of shank while piece is in lathe.
9. Set up body in milling machine and mill the slot.
10. Machine the sliding block, Part 3, to size.
11. Assemble body, shank, and sliding block. Drill with tap drill through body and sliding block. Drill clearance drill through one side of body.
12. Tap sliding block.
13. Counter bore for screw heads in body.
14. Make the adjusting screw, Part 5.
15. Make screw Part No. 4.
16. Assemble all parts. Turn adjusting screw until sliding block is moved solidly against wall of body. Chuck the assembly in lathe and indicate true, then drill and ream the 5/8-in. hole for boring bar.
17. Drill and tap setscrew hole through body and block with parts assembled.

In making the adjusting screw 20 threads



Parts of the eccentric boring head

per in. were cut, and the screwhead divided into fifty divisions thus giving an adjustment of .001 of an inch per division.

The taper should be cut to match the mill-

Assembled boring head

ing machine to be used. If desired, extra shanks may be made where different makes of milling machines are to be used.

WRINKLE FINISHES FOR THE GENERAL SHOP

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Artistic finishes of various textures have been in use for many years, but have been limited to industrial uses. Such finishes have never been accepted widely in shopwork for two major reasons. The first and foremost is because the average shop teacher is not familiar with the technique of applying such finishes, and being unfamiliar with this technique he wrongly assumes that it is perhaps very difficult to do. Actually the opposite is true. It is much easier to apply a good wrinkle finish than the same quality varnish or rubbed finish on a piece of walnut furniture. Secondly, there are on the market some air-drying wrinkle finishes which are advertised as being successful when applied with a brush and dried in air. This statement is true, but it must be applied and dried in an expert manner to be successful. Since these conditions are seldom existent with the novice it can readily be understood why one trial of such a product is sufficient.

To make the application of wrinkle finish successful in the average school shop, three major factors must be taken into consideration. With these under control any person with average intelligence can do a very acceptable job on the first attempt. These factors are, the quality of paint, the manner of application, and the procedure of fast drying or baking. These are not the only factors concerned with producing a good wrinkle finish, but if they are controlled, little influence will be felt from other factors taken separately.

The quality of paint will affect the texture of the wrinkle finish. Many good wrinkle finish paints are produced for industrial uses only. They are thus made to comply with a certain prescribed formula, and are to be dried and baked under carefully controlled conditions. If these conditions are not adhered to rigidly then good results cannot be expected. There are, however, some industrial paints which are not so critical. If these are obtained the experimenter can get surprisingly good results even on the first attempt. Selecting the proper paint for the prevailing condition, then, is of major importance.

In applying wrinkle finish paint the surface should be clean and free of grease or oils. Never use a brush. It is very essential to have a uniform coat of paint if a uniform wrinkle texture is to be obtained. If the coat is too thin the paint will remain glassy when applied. If too thick, a very coarse and deep wrinkle texture will result, thus making it difficult to keep free from dust. Consequently it is easy to visualize how a surface would appear when finished unevenly as usually occurs when using a brush.

The spray gun is the only adequate answer to the problem of application. The gun need not be a complicated high pressure industrial type. Any of the better grade touch-up type guns is adequate for the job. A consistent and dependable source of air pressure of around 25 pounds should be made available. Any small automatic compressor will produce sufficient pressure for a touch-up type of gun.

When using the spray gun a few points of importance should be observed. Use just enough thinner to the paint so it will atomize through the spray gun for proper spraying and no more. Too much thinner will contribute to running or lagging when baking. Apply the paint in uniform thickness. When making a pass with the gun be sure the area is well covered and no gap exists between passes. Keep the gun far enough away from the surface to permit the air to atomize the paint properly before it strikes the surface being painted. When moving the gun back and forth move it parallel with the surface being painted. This will keep the nozzle a uniform distance from the surface. The pressure should be constant. This can be obtained only with some automatic regulating device which is usually a part of a standard compressor. The number of coats to be applied can be determined only by trial. Usually at least two coats should be applied. The second coat quite often will fill in a thin spot between two passes. Passes should be made by horizontal movements whenever possible. It should be emphasized again that an excessive amount of paint will make a heavy wrinkle which is not too desirable. It is essential that a spraying booth with some type of exhaust system be made available from the viewpoint of safety and health. A turntable upon which the work can be rotated while spraying is also a great advantage.

To wrinkle properly, industrial wrinkle finish paints must be fast dried in an oven of some type. In most instances it is advisable to allow the painted object to remain out of the oven for as long as 15 minutes after painting to permit evaporation of some of the thinner before heating. Heat is then applied at about 150 deg. F. This will produce the wrinkle texture in a few minutes. The paint will be soft however and should be heated for a period of two or three hours at 200 deg. F. After this the object can be handled with reasonable care without damage. Thorough hardening and curing will take around

24 hours more. Of course if a high heat oven is available and the heat can be increased to 250 or 300 deg. it can be accomplished in about 3 hours. Another method of fast drying is by using as many infra-red lamps as can be crowded into the area within 10 to 12 inches from the surface being dried. This method is extremely fast. Complete wrinkling drying and baking can be accomplished in a few minutes.

With a little practice the technique of applying wrinkle finishes will become easy to do, especially when a few major factors are controlled. It is not essential that the operator have a lot of high priced professional equipment at his disposal to do a very acceptable job of painting. It should be pointed out that wrinkle finishes were developed for use in fast production work where as little time and care as possible is exercised in connection with the job. This very fact makes it quite adaptable for use by the amateur, who, with a little practice can turn out work which will surprise even himself. There are many items in the school shop which can be painted in wrinkle finish. It can be applied equally well to either metal or wood, provided all moisture is removed which would cause a blister to rise upon heating. It is advisable to keep heat as low as possible and heat longer when wrinkling on wood or paper.

As a final point it is well to bear in mind that the darker colors will wrinkle more readily. Black is the best one to use, of course.

A PORTABLE DEMONSTRATION UNIT

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Uniontown, Pa.

There has long been a need in the school shop for a feasible means of accommodating students in various areas about the shop for demonstration purposes. Even a separate demonstration room limits itself to portable tools and equipment. Where a machine is permanently mounted it is usually necessary to stand around it in a group to watch a demonstration. Standing becomes tiresome and clear vision of the demonstration is often obscured by one student standing in front of another student.

To meet this need a *portable demonstration unit* was made from discarded classroom furniture. Our units are eight feet long and in two rows, accommodating twelve students on each unit. By limiting the length of each unit a variety of groupings may be made within the shop.

The pictures show the versatility of the portable demonstration unit. Students may be grouped about any permanent mounted machine, around a demonstration bench, in front of a screen for showing visual aids and even in the finishing room — in fact, any place where it may be advantageous to hold a demonstration.

Uniontown Senior High co-operates with the State Teachers College, California, Pa., student teacher program. The following student teachers made possible this *unit* — Paul Glagola, Richard Birch, and photos by Howard Placchi.

CAROUSEL PIPE RACK

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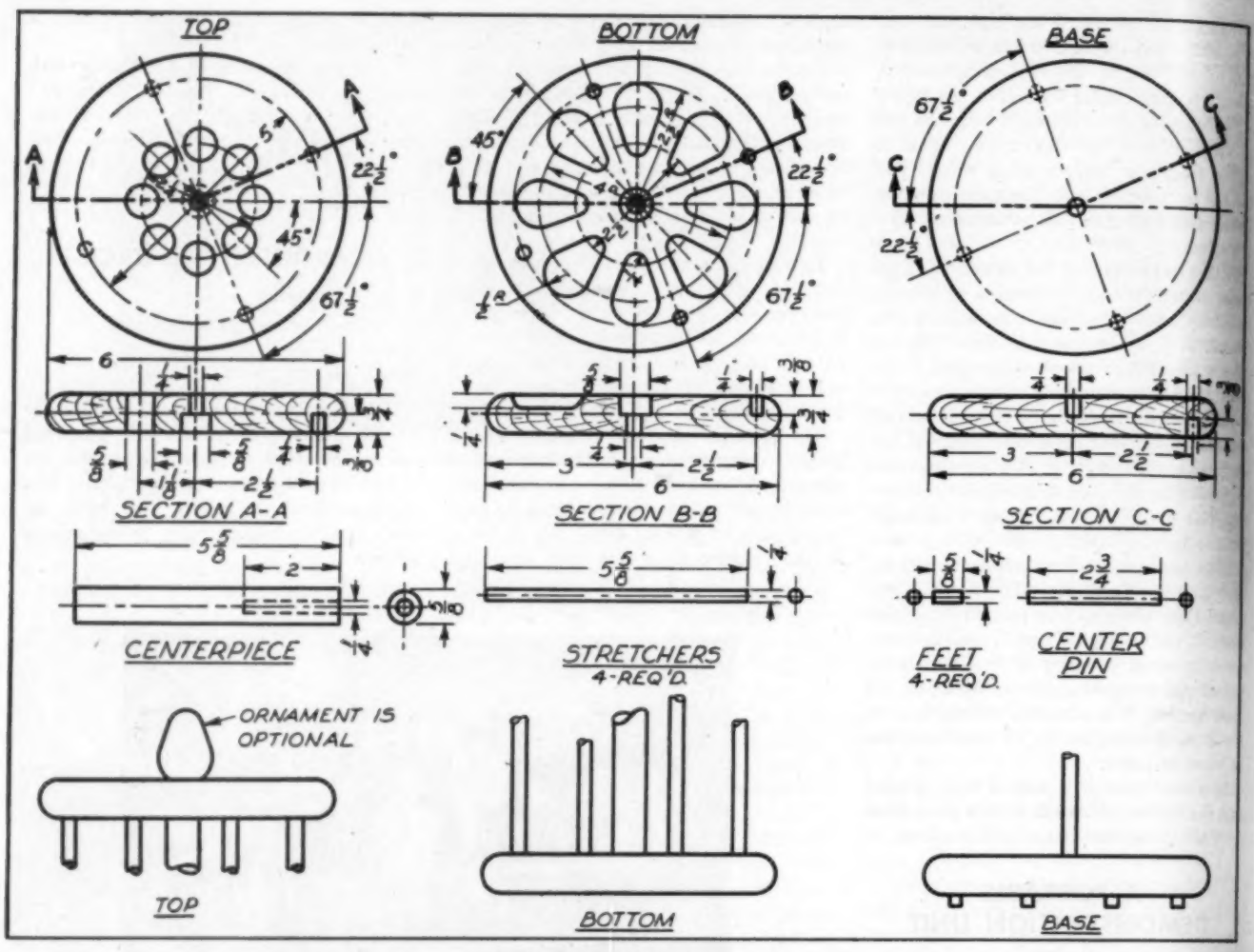
Only too frequently we find it difficult to provide project material for drill press and router work. The accompanying project was named *carousel* because of its similarity to a merry-go-round. It attracts and holds the boy's attention because of its having moving parts.

The portable demonstration unit

Rear view of demonstration unit

The demonstration unit in use



Details of carousel pipe rack

The only complicated part of the project is the routing of the depressions. This is best done after the layout, by drilling two holes one on each of the centers about 3/32 deep and the size shown on the drawing with a Forstner bit. Then using a round nose router follow the outline and rout to the desired depth.

The finish depends upon an individual decision, but two suggestions found to be good are painting the rods and handle black and leaving the walnut disks natural. The other is to finish the rods and the disks both natural before assembling.

Any good wood such as walnut, cherry, or mahogany will work well with the dowel rods to give a pleasing contrast.

The layout work is especially worthwhile. And other machines can be employed besides the band or jig and drill press by shaping the edges and turning the handle on the lathe.

Incidentally, the rack is usable only with straight stem pipes.

Carousel pipe rack

BETTER SHOP TEACHING WHEN SHOP FILM "KNOW YOUR HAND TOOLS" IS USED

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Burlingame High School
Burlingame, Calif.

Most industrial-arts teachers have used motion pictures at one time or another in an effort to enrich and broaden the content of their courses. They have found these films excellent, showing such processes as iron mining, glassmaking, lumbering, leatherworking, etc. Other good pictures are aimed at giving the student detailed knowledge on a specific operation, but these are usually narrow in application, and teachers hesitate to buy them.

Again and again, shop teachers put on carefully prepared half-hour demonstrations and then, when through, feel sorry that they do not have a movie of their presentation. If

Fig. 1. Dr. George Ormsby, California State Department of Education, lines up a shot in "Know Your Hand Tools," in the Burlingame High School's new general shop

they had, they could repeat it for slow students, for boys who were absent on the day when it was given, or for new pupils entering class late. It could be used year after year.

The author gave voice to exactly these thoughts in a recent conversation with Francis W. Noel, chief of the Bureau of Audio-Visual Education, in California.

Fig. 2. Production still, from sequence identifying the crosscut saw, using wood mockup

Fig. 3. Production still from sequence showing correct use of ripsaw

"That's a coincidence, Brown," Noel returned. "It just happens that a San Jose motion picture company plans a series of films on elementary shop technique. I'll put you in touch with them. Maybe you people will produce a picture that shop teachers can really use!"

So that is how "Know Your Hand Tools" came to be made in our Burlingame High School Shop. Figure 1 is a production still, showing the company at work with Doctor George Ormsby of the California State Department of Education lining up a shot.

In the picture, a typical high school boy sets about making a new shelf for a bookcase. This project was selected because it is fundamental in principle to practically all woodworking jobs. From the boy's angle the audience sees him measure the length and width, lay out the dimensions on the lumber, use ripsaw and crosscut, jackplane and blockplane, and finally smooth the shelf and fit it into place like "a hand in a glove." An instructor appears at those points where the average student has difficulty, to help make the explanation clear.

Although we have a projection room adjoining the shop we have tried running this film in a corner of the shop with only those boys viewing the film who need that particular instruction. The results are good. The value of films of this type in the general-shop program lies in the fact that the boys who need the instruction can see it when they need it. The instructor is left free to work with other groups. Of all the teaching aids available, and teaching aids are the heart of any modern shop program, we think the film in which the boy can see the work actually being done is the most efficient. We have our own projector in the shop. It has become another full-time teacher, and the moderate cost of the films that can be used year after year, is very low.

Our experience has been that in using any instructional film more thorough retention of the material is achieved when a certain amount of class *preparation* is given prior to showing the film. During the preshowing discussion, the necessity for accurate measurement and correct tool technique, and emphasis that almost any project such as a table, cabinet, surfboard, or skiis requires the same opera-

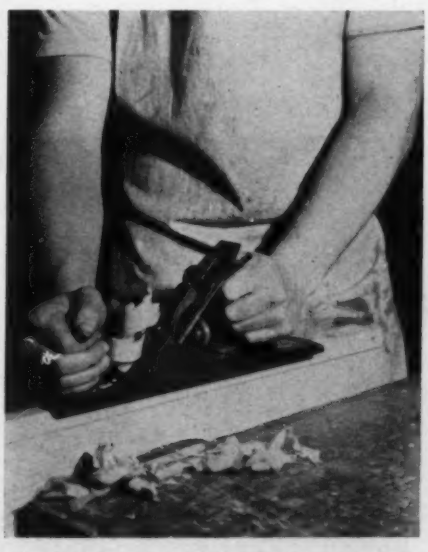


Fig. 4. Production still from sequence showing use of jack plane

tions as those shown in the picture is brought out. However, even without *preparation* it is surprising how visual-minded the modern youngster is. Some students learn more from the film than they would from an actual demonstration. This may be due to the fact that they watch more closely because a student, rather than a teacher, is doing the job.

Figures 2, 3, and 4 are production stills taken during the filming. If you'd like to look at "Know Your Hand Tools" write for a preview print from Occidental Pictures, Inc., 2334 West San Carlos, San Jose, Calif.

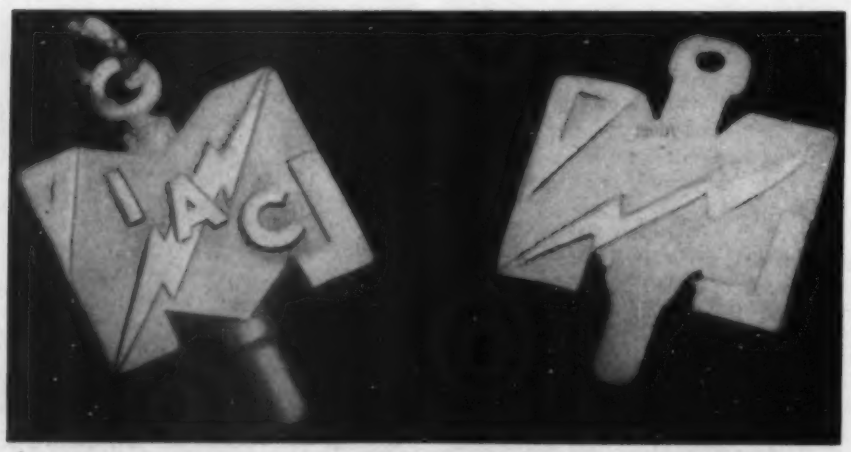
Some persons have suggested that increased educational value would have resulted if the students had turned out all of the actual keys. We feel, however, that the problems of mass production, with limited facilities would hardly serve such a purpose. In any event, the experiences involved were of the type too frequently absent in many industrial-arts courses, namely, a definite need, discriminating design, and a definite use.

DESIGNING AN INDUSTRIAL ARTS AWARD

IRA H. JOHNSON
Assistant Professor of Industrial Arts
State Teachers College
Mankato, Minn.

Increased activity in our industrial-arts club indicated a need for some method of recognizing outstanding club service. At about the same time an advanced art metal student was searching for a suitable project. Such a situation suggested the fabrication of an appropriate "key" as art metal experience.

The desirable design characteristics of such a key were listed and many sketches drawn, revised, and redrawn. Finally, after a certain amount of compromise, a design was submitted to the club and with only minor modifications, accepted. An exact size wax model was fabricated and then cast in silver, using the principles of the "lost wax" method. This key, shown on the right in the illustration, together with certain additional design characteristics, was submitted to a commercial firm. The result was the key shown at the left, which we now award for outstanding service in our industrial-arts club.

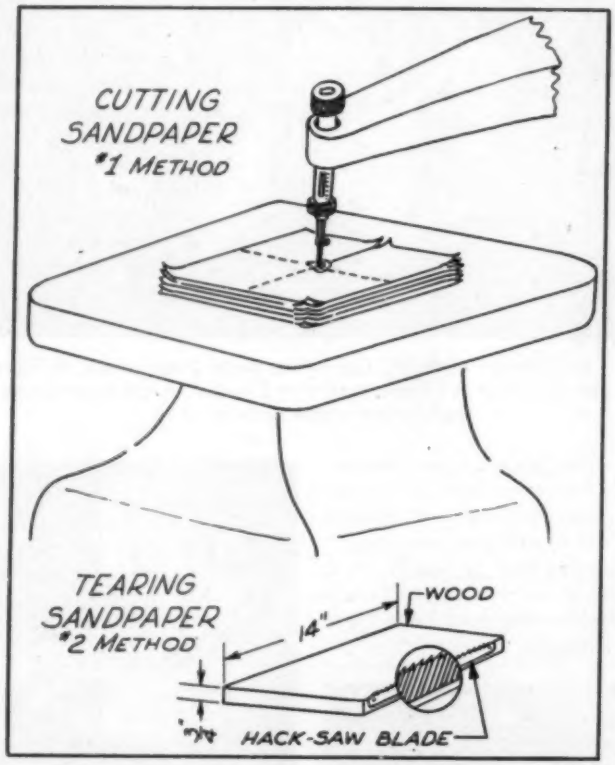


Industrial Arts Club Key of the Mankato State Teachers College, designed by Ira W. Johnson, assistant professor, and Allan Hohenstein, student

TWO METHODS OF CUTTING SANDPAPER

ALFRED E. CAVANAGH
Industrial Arts Consultant
Kensington School
Great Neck, N. Y.

Most shop teachers cut the standard size sandpaper into four parts by tearing on the sharp edge of a bench or desk. This system



Cutting and tearing sandpaper

is improved by using method No. 2 (as per sketch), which I used quite a bit. In this method, a hack-saw blade is nailed through the hole in each end to a board as shown. The teeth are set 1/32 to 1/16 of an inch above the surface of the board.

Method No. 1. Looking still further for improvement, I cut the sandpaper on a scroll saw (as per sketch). The sandpaper stack consisted of approximately 35 sheets. Two cuts resulted in one hundred and forty 5 by 6-in. pieces of sandpaper with nice smooth edges. The blade is then rendered useless, but can be replaced for three cents. It is worth many times this amount in time saved. I have estimated that sandpaper can be cut approximately five times faster by using No. 1 method, than it can be cut by using any other method I know of. Cutting time for 140 — 5 by 6-in. sheets, is 45 seconds.

EARLY PROBLEMS OF NEW INDUSTRIAL-ARTS TEACHERS

JOHN A. CAREY
High School
Santa Cruz, Calif.

New teachers should heed the popular saying, "You'll learn a great deal and do a lot of work during your first year of teaching."

After three weeks in the shop, I sat down and outlined my teaching problems for I knew that if I waited, those problems would appear ridiculous later on, or they would possibly be forgotten. I wanted other novice industrial-arts teachers to see the common difficulties which I encountered so that they might better carry out the program for which they were trained. If the first year is to progress successfully the beginning weeks are the most important; for attitudes, respect, efficient teaching, and satisfaction depend largely on getting that all-important *good start.* The following are problems which seem to be commonplace and could be partially eliminated by the realization of their nature. Most of these will not develop into problems if they are taken into consideration months before the opening day of school.

Coming fresh from well-equipped college shop areas, the new school shops do not seem to have the expected facilities. All schools are not the same as to equipment and in many cases such things as safety guards, blackboards, shelves, chairs, or even toilets and washrooms are not found. These seemingly important things will have to come later and temporary facilities will have to be prepared.

It may soon be noted that certain important items in your college preparation had been gone over hurriedly, or else, well-meant advice was not taken seriously. There are many surprises and problems at first, but the earliest encountered is the full realization that the shop, its equipment and occupants, are your responsibility and yours alone. You must see that the equipment gets replaced or repaired, shortages taken care of, storage facilities and racks prepared, toolrooms made workable, school procedure learned and that a program be efficiently prepared and kept rolling in a manner approved by your school superiors. A course of study is most necessary but after a few days one is most aware of its limits; so have progress charts ready to be filled out and your program in working order. Safety rules written out in question form will save precious hours. Many of the students will expect the new teacher to be "soft," therefore, start something before they do. By giving the students information and tests early in the school term you can show them that you mean business. The tests can be on operations, tools, safety, and so forth; but be certain to give them the idea of an objective, businesslike course. Be sure that texts are available at the start of school and that you are familiar with their content. Other reference materials and visual aids will also be necessary. You may expect many interruptions during the first few weeks of the school term so be prepared to keep your students occupied while you are busy in other parts of the shop. Do not overlook the fact that good texts and project drawings can more readily put across the objectives of the course.

You will painstakingly order tools and equipment only to find some items inadequate in quantity. Pliers or other small tools might be missing from your toolroom before an adequate "check-out" system is installed. In some cases other departments may claim equipment you thought belonged in your shop. Some equipment might arrive with parts missing or in need of an electrician for installation. Tools and supplies ordered from the most reliable of firms are sometimes delayed months after school starts. It is, therefore, most unsatisfactory to order these things after school commences. Place your orders as early as possible and get some advanced assurance as to the delivery date. It is wise to overestimate the amount of materials needed rather than underestimating your needs. Few new teachers realize just how much material will be needed for a complete session.

After the first few days of teaching one feels there is little time left for anything but school work. If you move into the vicinity shortly before school begins, as many do, such things as yard work, building storage units, painting, and so forth, to make your new home more livable will have to wait. Try to move into your new living quarters well before school gets under way so that you will have the time to get comfortably settled. The local school administration office will help to find you a place to live but you will have to make some adjustments regardless of how adequate it may be.

The following are tips which may help to keep further problems from occurring. During the first year try to teach only those subjects with which you are most familiar. Have your records on hand for there will be many forms to be filled out. Learn the names of your fellow teachers as soon as possible. Familiarize yourself with the layout of all buildings and grounds, not only to help you get around quickly, but to give you that all-important feeling of belonging. Have all teaching materials in such condition as to allow for good, quick organization; even if you must carry it under your arm, leave it in your car, or even on the floor. One is not always given an office or even a desk. There will be many school social affairs to attend and a great deal of talking to do so keep in good health. It should not need stating, but do not expose yourself to any illness, even a cold, for to be new, busy, nervous, and sick is the poorest way to get established.

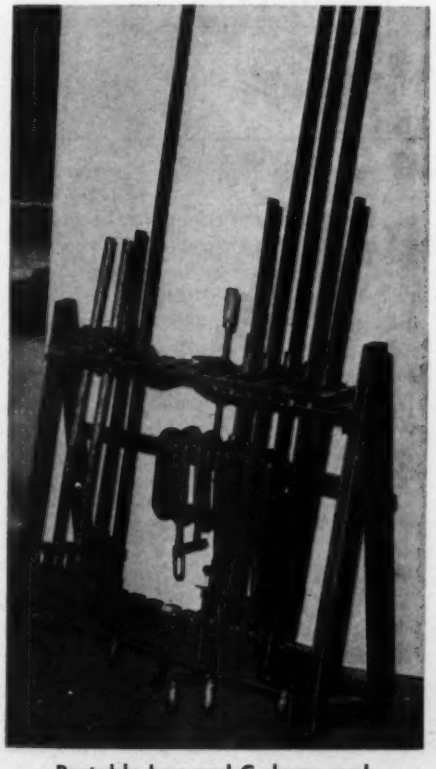
Along with the problems will come pleasant surprises and examples of all-out co-operation. You will find the administrator, fellow teachers, and members of the community most willing to help and there will be many people you will enjoy meeting and knowing. By the fourth week of teaching the greatest problems will begin to iron out, due to an understanding on your part of the correct channels and procedures. It will make you self-conscious to see your administrators making exceptions in your case and reading your requests before other matters.

Industrial-arts problems are never completely solved, but after the early difficulties in organization are eliminated all others come under the heading of individual energy, preparation, or further adjustment.

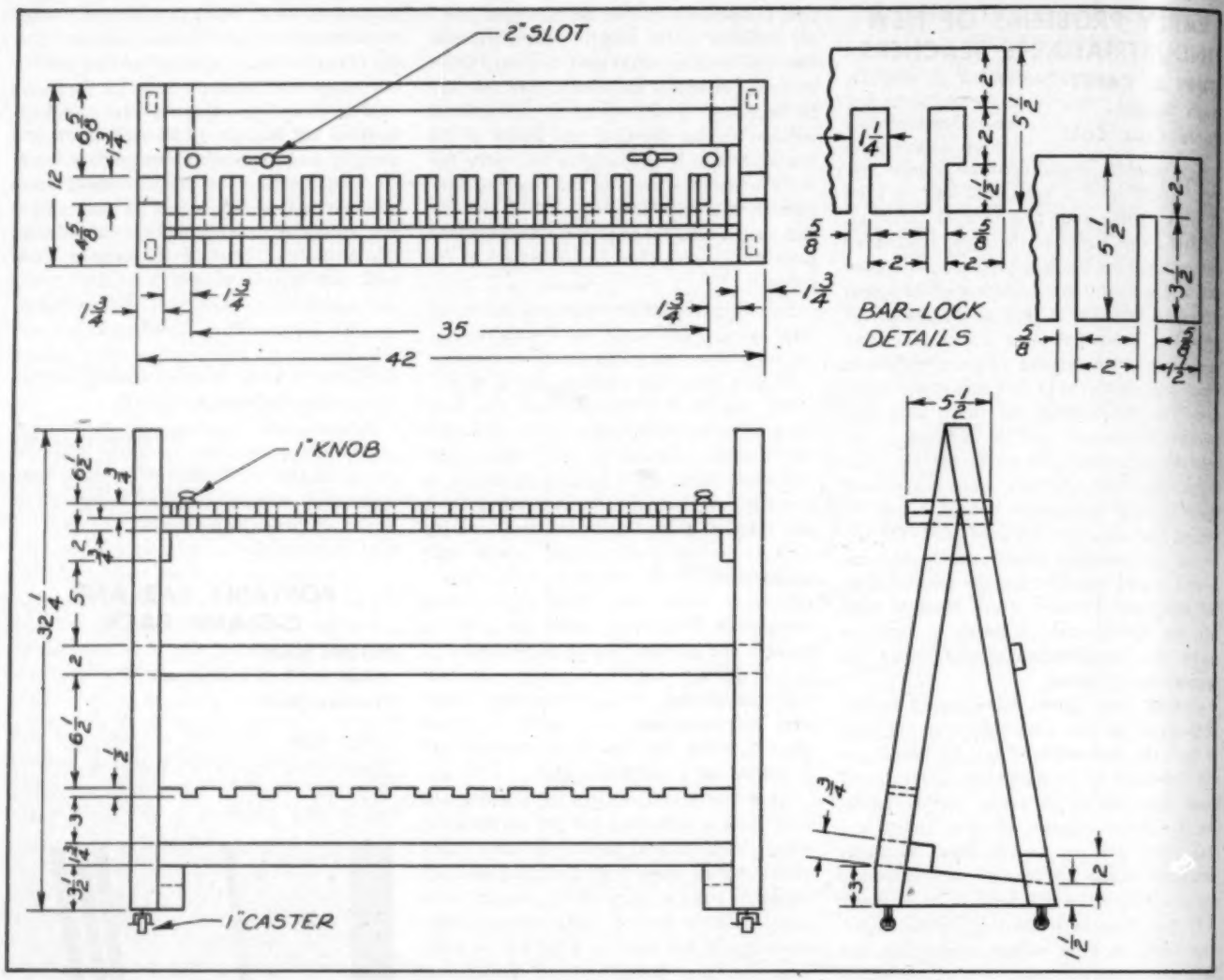
PORTABLE BAR AND C-CLAMP RACK

MELVIN HAM
Industrial Arts Instructor
Choteau, Mont.

This type rack offers an advantage over other type racks inasmuch as it is mounted on steel casters and can be moved to any part of the shop where it is needed. It is also



Portable bar and C-clamp rack



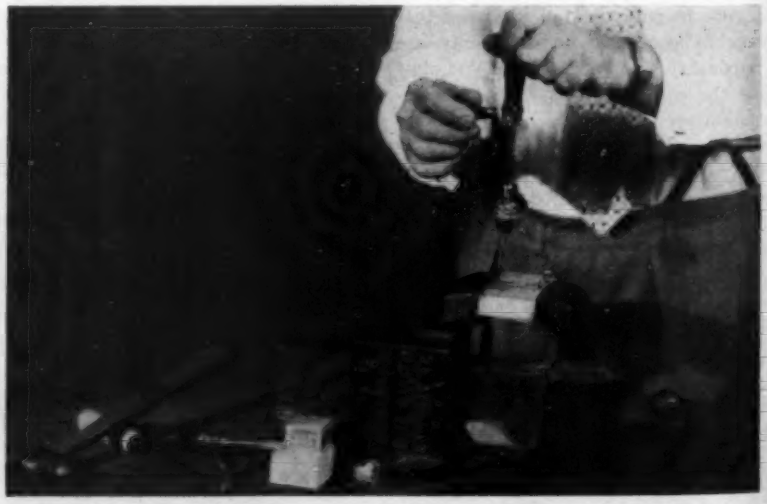
Details of portable bar and C-clamp rack

built low so that the clamps can be returned with the minimum amount of effort even for students in the lower grades. The bar clamps are held in place by a sliding bar at the top that closes the slots after the clamps are returned to their places. The C clamps are hung across a bar that extends across the rack at the back. Hand screws may also be secured to this bar.

E-Z MADE CRYSTAL RADIO RECEIVER

HARRY J. MILLER
Teacher of Electricity
Gillespie Junior High School
Philadelphia, Pa.

When it comes to introduce the subject of radio at the industrial arts or vocational school level, and to orient to the concepts of radio reception, any device which will make



Make 1/16 x ½ x 1½ in. brass terminal strips. Drill each for 2 No. 3 wood screws. Bend a short riser on each, and drill for No. 6-32 r.h. brass machine screw

Square, sandpaper, dust, and shellac the 8 by 10 in. wood base, and mount two terminal strips of brass at each end of the connections

the fundamental principles easy to understand is a teaching tool welcomed by the instructor.

Included in this category is the time-honored, galena crystal receiver of which there are many types. The one pictured is simple, made from materials that are readily procurable and provides a worth-while educational experience. As a teaching device it is old, but then the students are new, and they are likely to grasp the nebulous ideas of radio better if they are developed through the medium of a tangible project fashioned by the student with his own hands.

Properly wired, this receiver will afford its builder the thrill of tubeless radio reception. From there he may go on to a more modern crystal, a more complex coil and circuit and be introduced to tubes as detectors and amplifiers, and loud-speakers in place of headphones.

Radio reception sans tubes is beyond the knowledge of most of today's youth, in the light of the many-tubed radios that meet their eyes daily. But the experience of radio and television people leans heavily in the direction of learning fundamentals on the lowly *crystal set* level.

The antenna for this set should be on the roof, and it should be from 100 to 150 ft. long. If the set is near a radio station, there may be sufficient signal strength to allow the use of a bedspring as an aerial. If it is in a rural area, a lone wire may be strung between two sturdy trees and insulated from them by glass or porcelain insulators. Allow some slack in the wire rather than drawing it up too tightly.

Where the ground wire is attached to a waterpipe, the surface of the pipe at this point should be scraped clean and a ground clamp fastened tightly around the pipe.

To operate, move the wire of the cat's whisker slowly across the face of the crystal until a scratching noise is heard in the earphones, then move the alligator clip from loop to loop until the station comes in at its peak volume.

If a fixed crystal is used, simply move the clip to the proper loop on the tuning coil.

(See other illustrations next page)

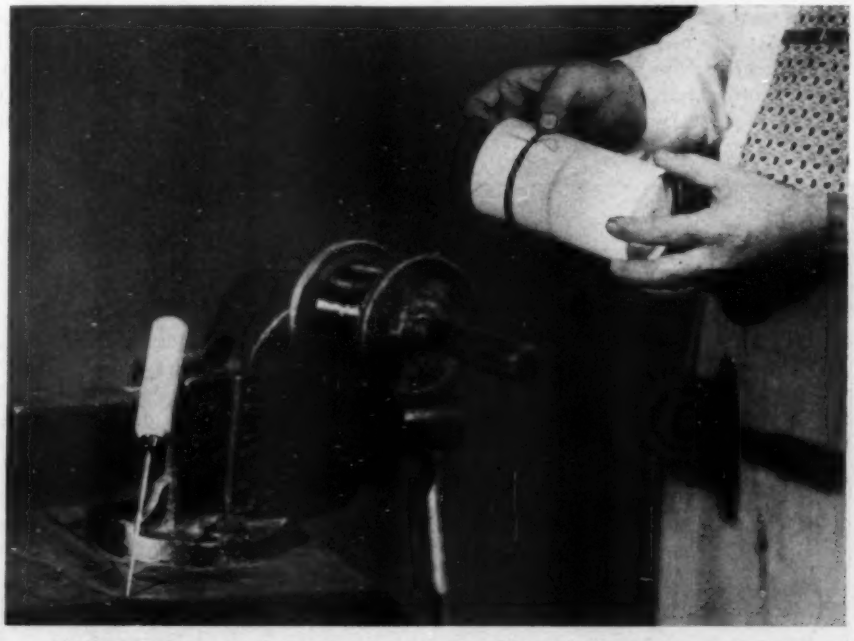
RAYON FLOCK FOR THE GENERAL SHOP

M. D. ROBERTS
Assistant Professor, Manufacturing Processes
Purdue University
Lafayette, Ind.

During the past few years the application of flock finishes has taken a new step forward. This has been largely due to the improvement in quality and appearance of the short fibers which make up a flock finished surface. Rayon has largely replaced cotton for this technique. The result is a soft yet brilliantly smooth finish which is more durable as well as more pleasing to the eye. These fibers are available in many colors and are usually one sixteenth or three thirty-seconds of an inch in length. When properly applied a very useful finish for a specific purpose will result.

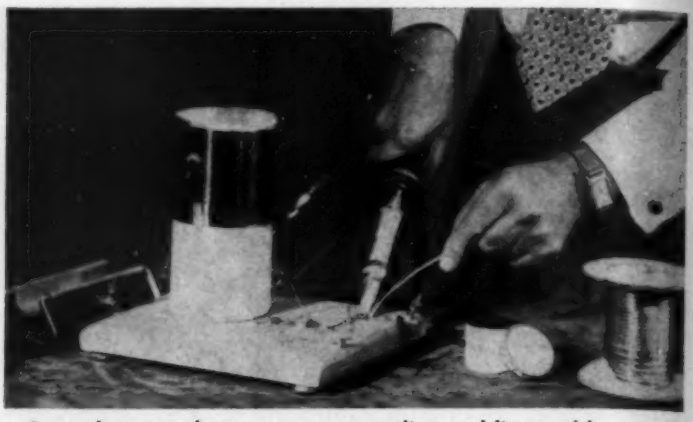
Because of the professional appearance imposed by flock finishes, most amateurs get the impression that applying flock finishes is a difficult operation. This is not true. With reasonable care it is quite easy to do. With

(Continued under "Rayon Flock" on next page)



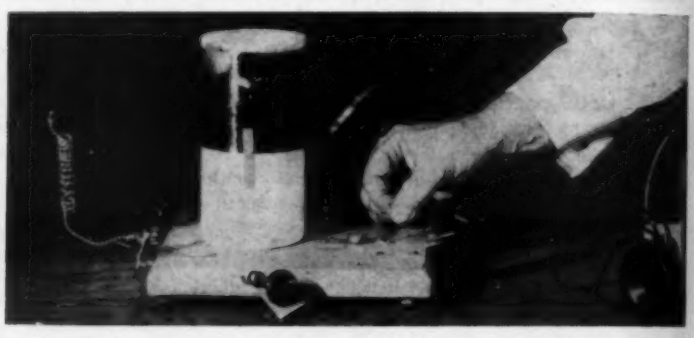
Shellac a quart-size ice cream carton. Punch two holes in one end, 1-in. apart. Thread a piece of No. 20 or 22 wire through hole and tie a knot in the wire so it will not pull out. Make the projecting end 12 in. long. Then wind 20 turns, make a loop, and bring it out. Continue bringing out loops every 20 turns until 200 turns have been wound

Soldering the head of each 6/32 terminal screw to its terminal strip. Scrape the enamel insulation from the wire and use solder and soldering paste sparingly.

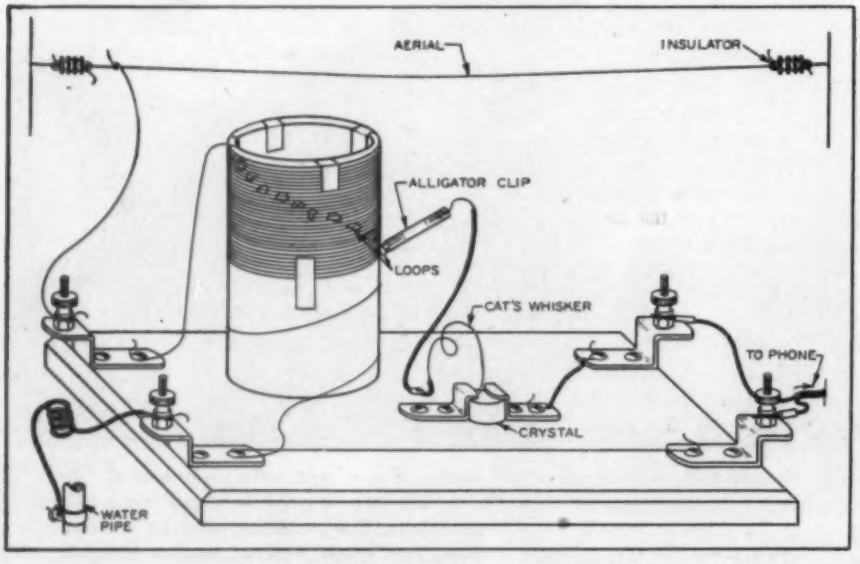


Space loops so they come out on a diagonal line and knot one under the other. Sandpaper the enamel insulation from each loop, and attach an alligator clip to the wire from the crystal bracket. Mount the crystal under the two small brass brackets and solder all connections

Drive non-marring casters at each corner of the base. Fasten coil to base with a screw. Use a large metal washer under the screw head. Fasten wire in place with Scotch tape and shellac entire coil when the winding is finished



The fixed crystal shown, may give better reception than the cat's whisker type. The whisker is a piece of stiff, thin brass wire filed to a sharp point. One terminal is connected to the aerial and the other to the ground (water pipe). No. 20 or 22 enameled wire is used on the coil



Assembled crystal radio receiver

RAYON FLOCK

(Continued for previous page)

comparable experience it is easier to apply flock finishes than any other type of finish, even including such easy-to-apply finishes like wrinkle, etc. For the general shop teacher it will fit into a number of uses in an excellent manner. Many small items like ash trays, book ends, table lamps, etc., require some type of cushion or cloth finish on the bottom. There is, at present, nothing which can compare with rayon flock for ease of application, rare beauty, and durability.

There are, however, a few important points for the novice to keep in mind when applying flock finishes. Use care in selecting a color. They are all the same price. Brown is always a good bet, but bright colors like red, green, wine, etc., will produce effects very pleasing to the eye. The surface must be worked down smoothly. Any irregularity will show through plainly on a flock finish.

Work it down smoothly as though it were to be enameled or varnished. Take care that the surface is nonporous. The adhesive must be held on the surface to surround the fibers until it is dry and firm. If a bright color is used it is well to coat the object with a solid light color to give uniformity of background before applying the adhesive.

The application of flock must be preceded by an adhesive of some type. This adhesive must be the same tone and color as the flock to be applied to it. It is usually best, when purchasing flock, also to get the adhesive to match from the same source. It is best to apply it with a brush until a rather heavy and consistent coat is apparent. It should not be too thick, as a sag or run will occur on vertical surfaces which will show through after the flock is applied.

The flock may be applied by either of two easy methods. One is by blowing it on with a flock gun designed for the purpose. It resembles an insecticide dust gun in structure and operation. The force of air from the gun will result in a swirl effect on the fibers when they are blown against the adhesive, and at the same time will set them very firmly in place. For a smooth, even effect the flock should be sifted on the surface gently as it is held in a horizontal position. Flock can be purchased in small sifter containers which work very well for this purpose. Another method is to take a small can, remove the bottom, and cover it with window screen and use this for a sifter. The author has found that a common kitchen flour sifter with an inside rotating wire device actuated by an external handle is most effective in sifting the individual rayon particles on to the adhesive surface. Care should be taken that no lumps or pellets of flock fall upon the adhesive. If possible, each tiny fiber should be set individually into the adhesive, but obviously this cannot be done on a practical basis. When the sifting method is used the object being flocked should be tapped lightly with a small hammer while being held in a horizontal position, after an excessive amount of flock has been sifted on. The tapping will cause the fibers to sink more deeply into the adhesive and be held more firmly after drying. When possible it is best to leave any excess fibers on the surface for twenty-four hours, or until the adhesive is thoroughly dry. The object then can be turned upside down, tapped again, and the excess fibers kept for future use.

Flock should be kept tightly sealed and free from moisture when not in use. The presence of moisture will cause the loose fibers to ball up into small pellets which cannot be blown or sifted effectively. Try this simple and effective finish on one of your projects. You'll be amazed and pleased with the results.

CAST CEMENT PLANT HOLDER

ROY A. RADTKE
Supervisor of Industrial Arts
Milwaukee, Wis.
and
WALTER WUTKE
Instructor of Industrial Arts
Victor Berger School
Milwaukee, Wis.

In these days when teachers are looking for projects to supplement their regular shop files, the plant holder described herein offers many possibilities. There is nothing unusual in working with the more common basic materials such as iron, steel, copper, wire, and wood for they have been a component part of the program of industrial arts for many years. However, cement molding with its resultant casting does offer new vistas in the pattern of the industrial-arts curriculum.

In projecting projects of this nature, there are several major factors which require consideration.

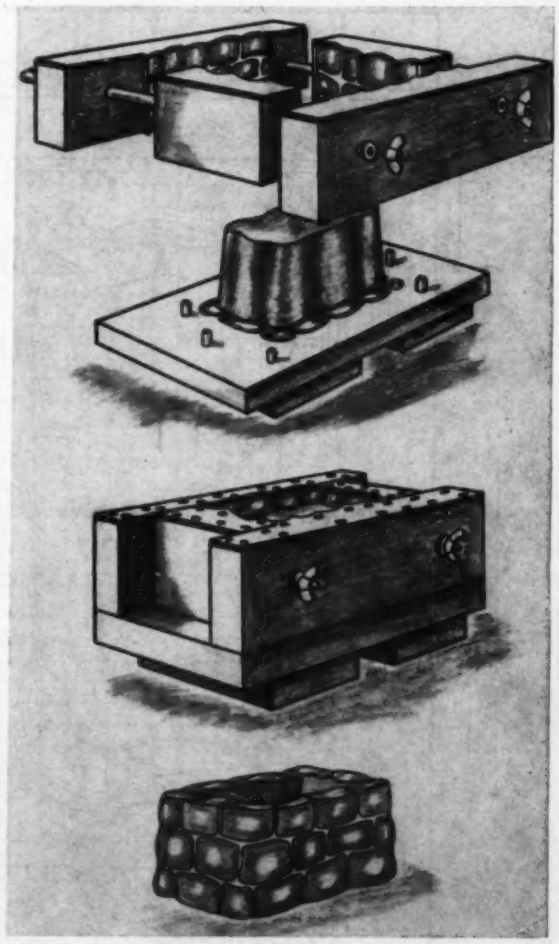
1. Is cement a medium that can be readily used in the industrial-arts shop?
2. Is form building within the realm of the average industrial-arts student?
3. Does the average shop teacher prefer to work with cement?
4. Should pupils build the forms?
5. Should the form be built as a class group project?
6. Are teachers sufficiently well informed to use cement mixtures?

In considering the above one may readily ask, "Well, what are the objectives?" Are the students to learn how to build cement forms, to use cement mixes, or is it a combination of both? I'm sure the latter is the case and that industrial-arts teachers will find as many teaching principles in this work as in any other of the more regular shop subjects.

So now let us consider the form first. This particular form and the one for the smaller plant holder shown in the photograph was developed by Walter Wutke, instructor of industrial arts at the Victor Berger School. Northern white pine was used in its construction. The surface covering is of 44 gauge aluminum. This covering strengthens the form, gives it rigidity, protects the edge of the undercuts, and provides a good surface for making the base of the plant holder smooth and level. The undercuts are carved out deep enough to indicate a stone effect, and at the same time allowing sufficient material between the undercuts to leave a mortar effect on the finished plant holder. The dowels in the base and the threaded rods with wing nuts are essential for removing the form from the finished product. This construction is also very beneficial for cleaning between the casts. The interior is finished with three coats of shellac, either orange or white will do.

The drawing for this particular mold was prepared in the Central Office for distribution among our teachers. Anyone planning to construct this form should find the photo, sketches, isometric, and mechanical drawings sufficiently clear to encounter no serious difficulty in constructing it.

In casting the plant holders, the following mixture may be used: 2 parts white Medusa cement, 8 parts mason sand, 1 teaspoonful mineral color, and ½ pint water. This is sufficient mortar for three castings. While Portland cement may be used it is not recom-



Mold for casting plant holder

mended because it does not take the mineral colors as well as the Medusa. With the Medusa some very interesting pastel effects can be obtained.

In preparing the mortar for the holder, the following suggestions should be observed. Mix the cement, sand, and color thoroughly before adding the water. The tests for the mortar and securing it properly into the mold are explained in the instruction sheet.

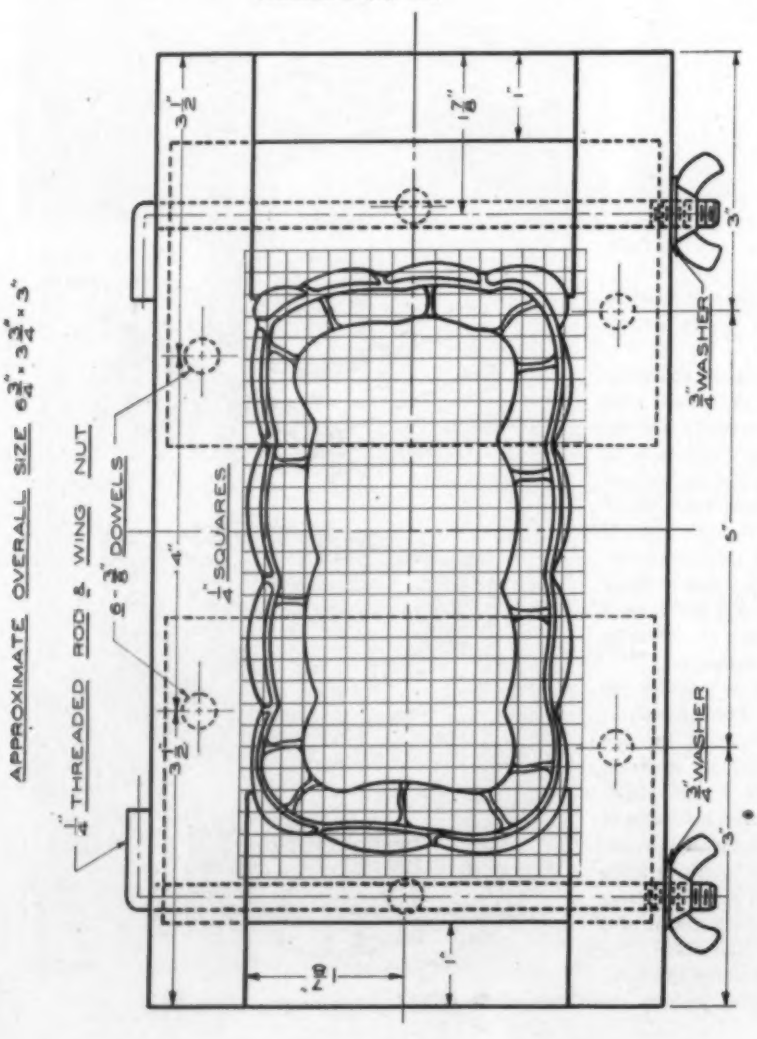
In experimenting with cement it is our aim to create an interest in an additional medium, to vitalize an area which is still comparatively new to the industrial-arts shop, and to explore materials which as part of our everyday life, do not at present have the emotional appeal which some of the more common materials have. This work can be vitalized if we will but apply ourselves to the task. For the supervisor and director of industrial arts, the task is to provide the opportunities and the encouragement for teachers to do this type of experimenting. For the teacher the avenue should be ever open to explore new vistas in areas still foreign to the industrial-arts shop.

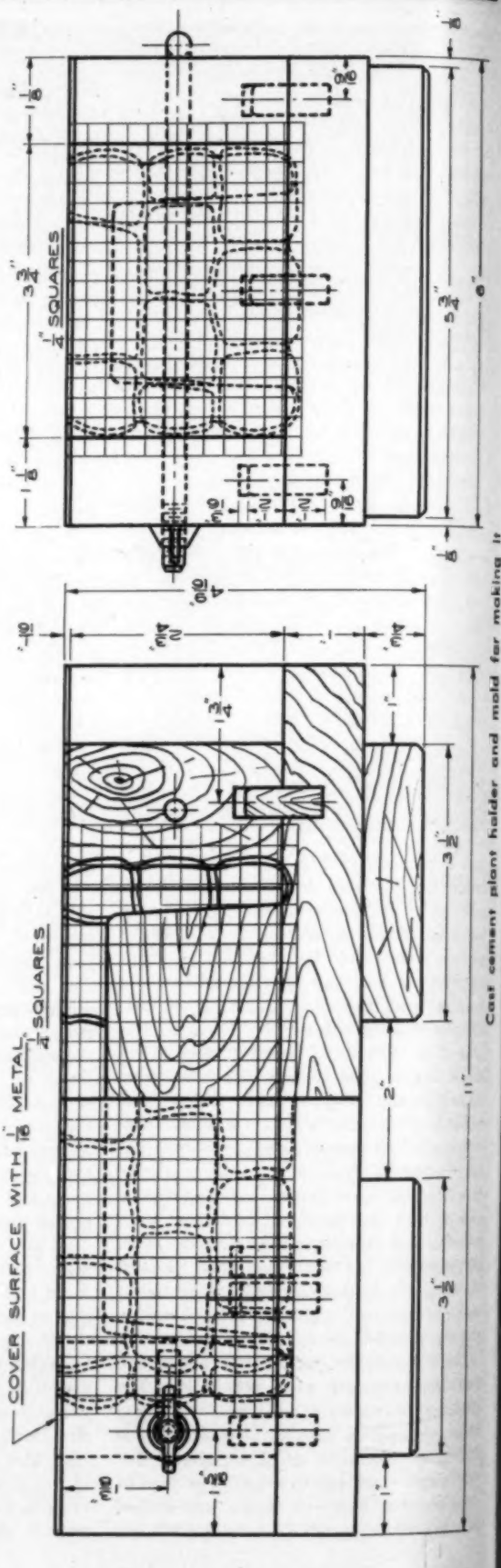
Purpose:

Mixing and Casting Cement for Plant Holder

1. To acquaint the student with the method of making a dry mix cement mortar.
2. To learn to add mineral colors to cement mortar.
3. To learn how to place a dry mix mortar in molds.

(Continued on page 26A)



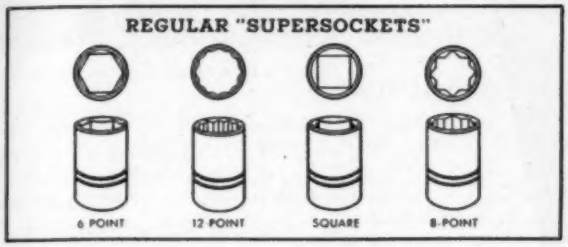


Cast cement plant holder and mold for making it

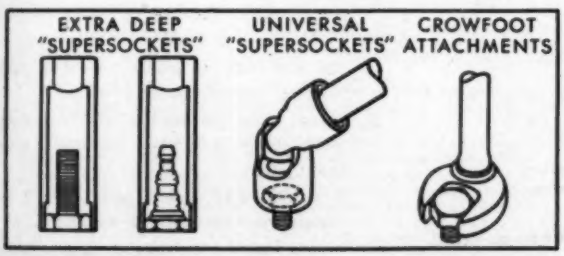
Memo to mechanics

How to do it right with WILLIAMS "SUPERSOCKETS"

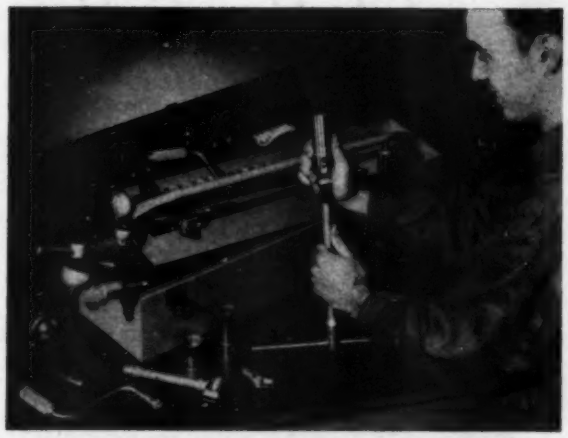
● Williams "Supersockets" present the world's most flexible wrench system. Engineered flexibility permits endless combinations of sockets, handles and accessories to solve any conceivable nut turning problem. With this versatile wrench system you can create wrenches for special applications, from delicate mechanical work to the toughest big jobs.



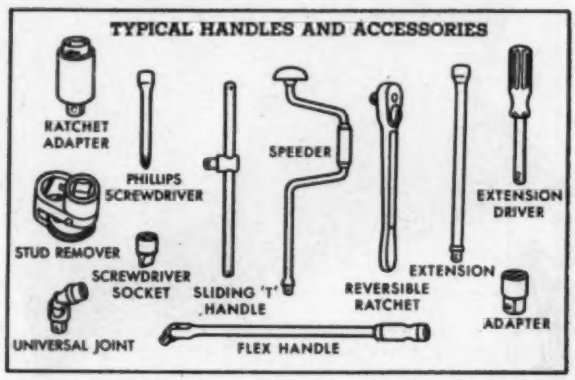
All "Supersockets", when used with Williams Reversible Ratchets, permit complete rotation of nuts where swing is limited to only 15°. 6-Point Sockets are best suited for nuts having rounded or worn corners and for breaking loose extremely tight nuts. Square and 8-Point sockets are primarily used for turning square nuts.



Extra Deep "Supersockets" are recommended where bolts extend more than the normal distance from the nut and for inserting and removing spark plugs. They minimize danger of injury to the mechanic and damage to equipment or tools. Universal "Supersockets" are often used with long extensions for reaching nuts obstructed by mechanical design where rotation of the nut would otherwise be extremely difficult. They have an operating range of approximately 130°.



Crowfoot Attachments can be adapted to a wide selection of handles for turning nuts in "over-and-under" locations difficult to reach by any other means.



Five square drive sizes, 1/4", 3/8", 1/2", 3/4" and 1", offer a range of openings from 3/16" to 3-1/8" for any type of work. Handles of a given drive size can be adapted to sockets of the next smaller or larger drive sizes by the use of adapters. Among the many accessories available is the Ratchet Adapter which may be used with any handle to give that tool complete reversible action.

Copies of this and other "Memos to Mechanics" are available free upon request.

OPEN END, BOX, ADJUSTABLE & RATCHET WRENCHES; DETACHABLE SOCKETS & BITS; IMPACT SOCKETS; TOOL HOLDERS; LATHE DOGS; "C" CLAMPS; CHAIN PIPE TONGS & VISES; FLANGE JACKS; PLIERS; SCREWDRIVERS; PUNCHES & CHISELS; SOFT FACED HAMMERS; HOIST HOOKS; EYE BOLTS; ROD ENDS; CRANK & BALANCE HANDLES; THUMB SCREWS & NUTS; BODY & FENDER TOOLS.

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SHELDON
CHICAGO

A better Lathe from any angle

Judge it from any angle: for accuracy, stamina, rigidity or capacity (for size). Check its component parts—its spindle, spindle bearings, lead screw, apron, carriage, bed, gearing, or the power delivered by its drive—you will find the SHELDON Lathe a quality tool both in appearance and "under the hood".

Write for Catalog

SHELDON MACHINE CO., Inc., 4244 North Knox Ave., Chicago 41, Ill.

2. Add the color to the dry sand and cement.

3. Mix the sand, cement, and color thoroughly before adding the water.

4. Add the water. Mix carefully breaking up any lumps that may form.

CAUTION: Too much water will cause mortar to stick to sides of mold.

5. Test by taking a small amount of mortar and press in the palm of the hand. It should hold together but the hand should feel damp, not wet. Another test is to take up a small portion and trowel it in the palm of the hand. If the water rises to the surface then too much water has been added. If, however, the material falls apart more water should be added.

6. Place the mortar in the mold a little at a time and ram fairly tight with a rubber tipped ramming tool ⅜ in. diameter. The rubber prevents damage to the undercuts on the form.

7. Continue to fill the mold with mortar using the tapered portion of rectangular ramming tool to force mortar into the undercuts.

8. After the mold is filled the top should be leveled off and smoothed over with the trowel.

NOTE: The top of the mold is the base of the plant holder.

9. Remove the form from around plant holder and place the latter on a straight board to harden 24 to 48 hours. A damp cloth over the casting will aid in the curing.

10. The holder may also be placed in water for another 48 hours to insure proper curing.

11. Coat the inside of the flower box with an acid resisting paint to prevent water from seeping through pores.

12. Paint the outline of the blocks with a clear cement and water mixture to give mortar joint effect.

13. Glue small felt pads at each corner on bottom so that box will stand firmly.

14. Insert a nonferrous metal false bottom in holder to provide an air space and to permit

(Continued on page 28A)

CAST CEMENT PLANT HOLDER

(Continued from page 346)

Tools:

Dish pan, tin cup (1 pint), pointing trowel, mallet, and two tamping tools.

Materials:

White Medusa cement, mineral color, mason sand (sifted through fine screen), and water.

NOTE: The following mix is sufficient for 3 plant holders: 2 cups of cement, 8 cups of sand, 1 teaspoonful mineral color, if color is desired, and ⅔ pint water.

Procedure:

1. Measure the quantities with the tin cup.

Cement plant holders

Save vital tools and supplies—

DISSTON® FURNISHES INSTRUCTION MATERIAL *FREE!*

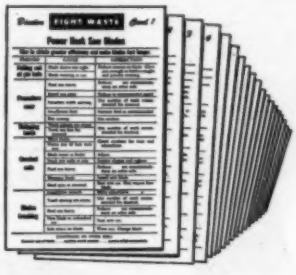
The national emergency brings with it a vital need to stop waste of essential tools, materials, and manpower. Now, the new Disston "*Fight Waste*" Program shows the way—gives you a concrete plan to follow in your classroom!

ENDORSED BY GOVERNMENT!

Commenting on the Disston "*Fight Waste*" Program, Mr. H. B. McCoy, Assistant Administrator, National Production Authority, writes:

"The program . . . is in direct support of the national need for conservation of materials and equipment. . . . We are most anxious to increase productive efficiency as well as production capacity. We are looking forward . . . to the beneficial effects of the efforts of your company in this direction."

INDIVIDUAL INSTRUCTION CARDS FOR YOUR STUDENTS



These cards cover 31 different kinds of cutting tools—contain expert information and recommendations on the proper choice, correct use, and best care of each type. You'll find them a valuable and practical aid in instructing beginners, speeding training, improving workmanship, and in lengthening useful life of your equipment. You can get a supply of these cards *free*—without cost or obligation—whether or not you are a user of Disston Tools. Use the "Pocket Foreman" Manual as a guide in selecting cards.

ALSO: New "Fight Waste" edition of Disston Saw, Tool & File Manual. Chapters on how to choose and use popular workshop tools; how to sharpen and refit saws; proper care of tools; how to choose suitable woods. Sent FREE on request!

Use quality tools for longer tool life!

DISSTON TOOLS FOR THE CLASSROOM: Hand Saws, Hack Saw Blades and Frames, Files, Bevels, Gauges, Squares, Circular Saws, Dado Heads, Band Saws, Wood Turning Chisels. Also Practice Filing Blades. Complete information and prices on request.

VALUABLE MANUAL—

"The Pocket Foreman"

Reproduces all 31 Instruction Cards pictured above. Also tells how to get the most out of the "Fight Waste" Program in your shop. Free copy will be sent on request—use it to determine type and quantity of individual cards required.

WALL CHARTS—

Show How to Use Tools Right!

Proved in classroom use! Big, informative charts, illustrated with "how-to-do-it" photos and diagrams. Supplied without cost.

GET COMPLETE INFORMATION on the Disston "Fight Waste" Program. Write today or use the coupon!

HENRY DISSTON & SONS, INC.
438 Tacony, Philadelphia 35, Pa., U. S. A.
In Canada, write: 2-20 Fraser Ave., Toronto 3, Ont.

CLIP and MAIL TODAY!

HENRY DISSTON & SONS, INC.
1038 Tacony, Philadelphia 35, Pa.

Please send me the following material free:

☐ The "Pocket Foreman" Manual, explaining Disston "Fight Waste" Program with reproductions of instruction cards and order-blank post card.

WALL CHARTS:

☐ How to use a Hand Saw
☐ How a Hand Saw Cuts
☐ Hack Saw Chart
☐ Choosing and Using Files
☐ Wood Turning Chisels
☐ Special Purpose Saws

_____ copies of Disston "Fight Waste" Saw, Tool & File Manual

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SCHOOL_____

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They All Know the Meaning Of Starrett Accuracy

Today, as it has been since 1880, STARRETT is the big name in the field of precision measuring tools . . . a name that is known and accepted wherever men work with skill and accuracy. The fine workmanship and lasting precision that have made Starrett Tools the choice of generations of skilled craftsmen have also made them the most satisfactory and economical choice for school shop equipment. Ask your distributor to show you Starrett Tools designed to fit both your needs and your budget. It pays to specify STARRETT.

FREE

"Helpful Information For Students and Apprentices"

This handy folder contains much valuable information as well as listing many Starrett educational aids available to you free or at small cost. Write for your copy. Address Dept. CE.

Starrett
STARRETT TOOLS
SINCE 1880
WORLD'S GREATEST TOOLMAKERS

THE L. S. STARRETT COMPANY · ATHOL, MASS., U.S.A.

BUY THROUGH YOUR DISTRIBUTOR

MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
DIAL INDICATORS · STEEL TAPES · PRECISION GROUND FLAT STOCK
HACKSAWS, BAND SAWS and BAND KNIVES

CAST CEMENT PLANT HOLDER

(Continued from page 26A)

surplus water to seep through. For construction of this false bottom refer to the following sketch.

References:

Cement — How To Use It, a practical handbook, Alpha Portland Cement Co., Chicago, Ill., pp. 5, 14, 19.

Concrete on the Farm, Atlas Portland Cement Co., Chicago, Ill., pp. 3, 95.

Color Cement Handicraft, Pedro J. Lemos, 1824, The Davis Press, Worcester, Mass. Chap. 1, p. 12, Chap. 3.

Ornamental Cement Work, Oliver Wheatley, Scott Greenwood and Son, London, England, pp. 9, 10.

ASSOCIATION NEWS

(Continued from page 8A)

Modesto, Calif.; ROSCOE C. DRAKE, Germantown, Ohio; JACK E. KREBS, Dayton, Ohio; GERALD I. MANKEN, Willshire, Ohio; ROBERT T. RINGER, Elyria, Ohio.

Harold G. Gilbert, State Teachers College, Oswego, N. Y., was toastmaster at the banquet. William A. Yaekle, Miami University, Oxford, Ohio, presented the guests — Mr. and Mrs. George C. Beery, Franklin County Board of Education; Professor Charles R. Kinison, trustee, Ohio University, Athens; and Professor Delmar W. Olson, trustee, State University, Kent.

Speakers were: Hilles G. Kemp, director of civil defense, High School, Belmont, Ohio; Louis J. Callan, New York State College for Teachers at Buffalo, N. Y.; William E. Warner, trustee of Alpha Chapter; George C. Beery, Franklin County Superintendent of Schools, and immediate past president, Ohio Education Association; and Kenneth William Brown, assistant director in charge of industrial arts, Philadelphia Public Schools.

ANNUAL EDUCATION CLINIC AT WINFIELD, KANSAS

The Fifteenth Annual Education Clinic will be held in Winfield, Kans., October 3 to 6 inclusive. This year it is to focus on the improvement of administrative practices in the state of Kansas. Three workshops will start Wednesday morning, one on the work of the superintendent, another on the work of the high school principal, and the third on the program in the elementary school focusing on supervisors and principals. Consultants are coming in from the state schools and the State Department and these three workshops will work together for two days searching out some of the major problems and making suggestions for improvement in some of these areas. The Kansas Council for the Improvement of Instruction will meet all day Thursday and Friday and Dr. Francis Chase of the University of Chicago will be present to work with the Council.

Personal News

WILSON H. HENDERSON DIES

The Bruce Publishing Company regrets deeply the loss of the last of the three associate editors

Wilson H. Henderson

who assisted William C. Bruce and Frank M. Bruce in the establishment of the *Industrial Arts Magazine* in 1914.

Wilson H. Henderson, at that time, was director of vocational education at Hammond, Ind. In September, 1914, Mr. Henderson was ap-

(Continued on page 31A)

DEWALT

...the ideal all-purpose machine for vocational schools

Hundreds of schools today are using DeWalt in their vocational training. This world-famous radial power saw enables students to learn *now* for *tomorrow!*

DeWalt is fast—accurate—safe. It's the basic woodworking machine for doing everything in woodworking. It also cuts plastics and light metals.

This *basic woodworking machine* includes: Pressed Steel Table Frame, Table Top Assembly on Steel Leveling Cleats, Machine Column and Base and Cantilever Arm, Grease Shielded Ball Bearing Carriage with frictionless Swivel Yoke Assembly, Direct Drive Motor with Grease Sealed Ball Bearings, Formex-Fiberglass Insulation, Overload Protective Cut-Out Switch, Special School Safety Saw Guard with Anti-Kickback Device and Set of Wrenches.

DeWalt is compact—takes up little floor space. Investigate the full merits of this all-purpose machine. It is available in models ranging from ½ H.P. to 7½ H.P. Write for complete information. Address: Dept. IA-10, Fountain Avenue, Lancaster, Pa.

DEWALT INC.
A subsidiary of American Machine & Foundry Co.

Best to Show! Best to Own!

Best of Brand! Best of Steel!

ATKINS Complete Line of "Silver Steel" JR. SAWS Ideal for Students

Precision-built to give students the "feel" of fine tools—sturdy and tough for classroom use—the Atkins line of *"Silver Steel"* Jr. saws has won outstanding popularity with instructors and students alike! From the famous Jr.-65, with its 16" blade and Perfection pattern handle, to Jr. hand saws and keyhole saws, the *"Silver Steel"* Jr. line is not only *complete*, but *replete* with features which only ATKINS offers!

USE—*DON'T ABUSE*—FINE TOOLS

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Home Office and Factory: 402 S. Illinois St., Indianapolis 9, Ind.
Branch Factory: Portland, Oregon • *Knife Factory:* Lancaster, N.Y.
Sales Offices: Chicago • Portland • New York

ATKINS

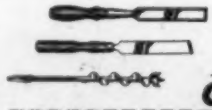
THERE IS AN ATKINS SAW FOR EVERY CLASSROOM USE

New improved woodworking calculator

answers countless questions in seconds...speeds jobs!

Here's the *improved* GREENLEE Calculator with more information on lumber, nails, painting materials, concrete and mortar mixes, tool sharpening tips, etc. A simple, speedy guide to more precise workmanship. Convenient . . . easy to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of various woods. 6" diameter, heavily varnished cardboard printed in three colors. **only 25¢**

No Stamps Please!



SPECIAL OFFER BY THE MAKERS OF FAMOUS GREENLEE TOOLS

GREENLEE

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☐ Enclosed is 25c. Send your "Handy Calculator" by return mail.

NAME.....

ADDRESS.....

CITY.....ZONE.....STATE.....

PERSONAL NEWS

(Continued from page 28A)

pointed assistant professor of industrial education, University of Wisconsin. In November, 1917, he was called to Washington and commissioned Major, Sanitary Corps, National Army. Toward the end of World War I he was put in charge of rehabilitation work, U. S. Army Hospital, Ft. McHenry, Md. He also served as educational consultant with the U. S. Army in Hawaii, and later was made a member of the educational advisory board, General Staff, U. S. Army at Washington, D. C.

He served as chairman of the emergency relief board of Knox County, Ill., and also as county superintendent of public welfare, Galesburg, Ill. His ready smile, fine sense of humor, and genial personality surrounded him with friends wherever he went, and many will sincerely regret his passing.

ARTHUR L. REAGH RETIRES

Arthur L. Reagh, director of vocational education and industrial arts for Grand Rapids, Mich., announced his retirement effective at the end of the 1950–51 school year.

He came to Grand Rapids from Seattle in 1919 to join the Union High School faculty. He was transferred to the former Davis Vocational School in 1920. In 1931 he was appointed supervisor of industrial education of Grand Rapids, and later when the industrial arts and the vocational departments merged he was made director of both.

Mr. Reagh was a consultant for the Federal Educational Policies Commission and also served on the Michigan Council of Education, and the Michigan Planning Committee for industrial arts.

He taught summer school at the Oregon State College, the University of Tennessee, and the University of Michigan.

The many friends that he made while he served as director of industrial arts and vocational education will sorely miss his genial and helpful personality, and they all wish him good luck for the coming years.

♦ Bernard J. Kennedy, instructor of mechanical drawing at Ottawa Hills High School, Grand Rapids, Mich., has been appointed director of the industrial arts and vocational education department. He succeeds Arthur L. Reagh, retired.

♦ Charles O. Anderson, 46, dean of young men and head of school council work for the Milwaukee Vocational and Adult Schools, died recently from a heart attack.

Mr. Anderson taught science, physical education, and social sciences at the school from 1935 to 1946. He was then appointed counselor for the veterans and served in that capacity until 1949 when he was made dean of young men.

♦ Dr. Chris H. Groneman, professor and head of the department of industrial education, Agricultural and Mechanical College of Texas, has been selected as consulting editor of McGraw-Hill Publications in industrial arts.

Dr. Groneman joined the staff at the Agricultural and Mechanical College of Texas in 1940 and was appointed head of the industrial education department in 1948. He has had practical experience in the building trades.

He is a member of many educational, vocational, and industrial-arts associations, and was

(Continued on next page)

STEEL

REALLY MAKES A DIFFERENCE

The New

BOICE-CRANE 6" and 8" JOINTERS

•

THE LONGEST FENCES
of any 6" or 8" Jointers

•

THE LONGEST TABLES
of any 8" Jointers

"A Jointer Is As Good As It Is Long"

NEW, WELDED, ALL-STEEL CONSTRUCTION
Permits strength, permanent accuracy and alignment, impossible with bolted-up cast iron construction.

LENGTH WITHOUT WASTEFUL UNUSED WIDTH
Using steel (3 times stronger than cast iron of same thickness), jointer tables have been extended without increasing width, thickness, weight or floor space. A cast iron jointer comparable all ways to Boice-Crane's new jointers would weigh more than twice as much.

NO SPRINGY OVERHANGING TABLES TO SPOIL HEAVY WORK
Tables undergirded full length. Steel is actually 2 to 3 times stiffer than iron.

ENTIRE INFEED TABLE A RABBETT ARM
The first jointers with adequate support for narrow rabbeting on wide stock.

TABLES GROUND FLAT, STAY FLAT
Both tables are simultaneously ground flat and parallel to closest limits.

QUICK, POSITIVE, MICROMETER-ACCURATE KNIFE SETTING
All knives cut the exact same depth, within .002" to .003" — setting a new standard for perfect work without chatter marks. Better finish, smoother operation.

LARGER HEAD DIAMETER — IMPROVED CUTTING ANGLE
3¼-inch diameter head (3⅜-inch cutting circle), 20% larger than conventional 6-inch jointers.

THE ONLY LONG-TABLE JOINTERS WITH FULL-LENGTH, FRONT-ADJUSTING DOUBLE-LOCKED FENCES
After the fence has been double-locked, depth adjustment is made without disturbing the locked fence.

ALL CONTROLS CONVENIENTLY GROUPED AT FRONT
Depth of cut control, table locks, direct reading depth scale and switch used in a comfortable, operating position.

BOICE-CRANE EXCLUSIVE GUARD
When rabbeting, guard stays right on the machine — simply turn and swing out of the way.

NEW ROTOR-ON-CUTTERHEAD OR V-BELT DRIVE OPTIONAL

BOICE-CRANE'S COMPLETE LINE OF JOB-RATED JOINTERS INCLUDES:

Model No.	Size	Without auxiliary feeding aids, recommended for stock length to	Length being a factor recommended for stock sizes to	Planes boards and panels to
3400	8" x 84"	16 ft.	8" x 8"	16" wide
2400	6" x 60"	12 ft.	6" x 6"	12" wide
*1400	6" x 36"	8 ft.	4" x 6"	12" wide

**Has cast iron base and table.*

USE COUPON TO OBTAIN FURTHER DETAILS.

BOICE-CRANE COMPANY
932 Central Avenue Toledo 6, Ohio

( ) Please send free literature on the new Boice-Crane Jointers.

( ) New 44-page Catalog No. 50 on entire line.

NAME .....

SCHOOL .....

STREET .....

CITY & STATE .....

No. 48 — A rugged, nicely balanced frame with fully guarded pistol grip handle of *unbreakable* black "Tenite."

No. 300 — a beautiful new heavy-duty frame. Unique lever blade tensioning device supplies more tension with less effort, easier and quicker blade changes.

LOOK AT THESE THREE

before you buy your next hack saws

No. 1027 — a fine quality frame with excellent hang. Strongly built for rigid blade alignment. Tough, molded handle heavily reinforced its entire length.

If you want the most for your money . . . if you want sturdy, accurate, long-lived hack saws that will take the punishment of schoolshop use and help bring out your students' best work — you'll do well with these Millers Falls frames. Each is an exceptional value. Each is a favorite with industrial and professional users. Ask your supplier to show them to you. You'll like their sure, comfortable grips, rigid construction, and fine balance. Dollar for dollar — feature for feature — they're outstanding buys for your schoolshop.

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MILLERS FALLS TOOLS SINCE 1868

The Mark of Superiority

UNBREAKABLE

"Tuf-Flex"® and "Blu-Flex"® Blades

You'll save money . . . get better work with these remarkable new flexible blades. Even in the hands of unskilled students, they're unbreakable. Super-tough "Tuf-Flex" for general purpose sawing — high-speed "Blu-Flex" for cutting hard alloy steels. Order a supply. They're setting new performance records in hundreds of schoolshops.

PERSONAL NEWS

(Continued from previous page)

formerly president of the Texas Vocational Association and chairman of the Industrial Arts Division of the Texas State Teachers' Association. Since 1947, he has been a member of the Industrial Arts Policy and Planning Committee of the American Vocational Association, and a member of the National Advisory Committee for the Ford Motor Company Industrial Arts Awards Program since 1949.

♦ PROF. PAUL L. COPELAND has been appointed acting chairman of the physics department at Illinois Institute of Technology, Chicago, Ill.

Prof. Copeland will temporarily fill the vacancy left by the recent death of Prof. James S. Thompson, chairman of the department for 17 years.

♦ DR. RICHARD A. CARRIGAN, biochemist and professor of soils at the University of Florida, has been appointed supervisor of the analytical chemistry section at Armour Research Foundation of Illinois Institute of Technology at Chicago, Ill.

♦ DR. LLOYD E. SWEARINGEN of Norman, Okla., formerly Research Professor of Chemistry at the University of Oklahoma, has been appointed Director of Basic Sciences Research, the Department of the Army has announced.

♦ R. RANDOLPH KARCH, University of Pittsburgh School of Education, conducted the second annual printing institute, sponsored by the University of Utah, from June 20 to July 11 at Salt Lake City.

The agenda included lectures, discussions, and practice in the growth and importance of the graphic-arts processes, type faces and type recognition, copyfitting, "cold" and "hot" type composition, layout and design, offset-lithography and platemaking. About 2000 visual aids were used to present the material.

♦ W. R. SUMMERVILLE of Ridgway, Pa., retired after 38 years of teaching and supervision. He served for five years as supervising principal before taking up industrial education. Except for one year in the new Kensington Trade School he has taught in the Ridgway public schools.

Mr. Summerville was graduated from the Clarion State Teachers College in 1910, attended Grove City College, and was graduated from the Pennsylvania State College in 1916. He organized the first Boy Scout Troop in Ridgway in 1917, and served as scoutmaster for 17 years.

Teachers and director had a dinner for Mr. Summerville in June and presented him with a radio and other gifts.

♦ HOWARD F. NELSON, assistant professor of industrial education at the University of Minnesota, has been given a sabbatical leave by the University to continue graduate work for the doctor of education degree. The leave, to begin in September, is to be spent at the University of Kansas, Lawrence.

♦ MARION H. GROVES has been appointed assistant to William A. Lewis, dean of the graduate school of Illinois Institute of Technology.

Mr. Groves has been assistant professor of psychology at the Institute for the past year. From 1943 to 1945 he was chief psychologist for the Cook County Criminal Court Behavior clinic. Later he served as an instructor in psychology at the University of Chicago and the University of California.

♦ HORACE HANKS, a hand compositor in production work at the Milwaukee Vocational and Adult Schools, died on April 24, 1951.

♦ LYLE J. SHAW is director of Catherine Bonifas Technical School, Escanaba, Mich.

♦ HENRY A. WHITE is the head of the industrial-arts and vocational education department at New Mexico Western College, Silver City, N. Mex.

♦ ELLSWORTH M. RUSSELL is assistant *professor* of industrial arts at New York State College for Teachers, Buffalo, N. Y.

♦ HENRY A. LOATS, assistant professor of industrial arts, Ball State Teachers College, Muncie, Ind., received his Ph.D. degree from Ohio State University on June 9, 1950.

♦ DONALD E. MILLER, who received his bachelor's degree in mechanical engineering in June at Illinois Tech., is one of the five students who won fellowships at the Armour Research Foundation of Illinois Institute of Technology. He will do graduate work at the Institute and industrial research at the Foundation, each on a half-time basis. Completion of the work will lead to a master of science degree in mechanics.

♦ WILLIAM J. MCNUTT of Philadelphia, Pa., was awarded the 1950 Westinghouse fellowship in power systems engineering at Illinois Institute of Technology.

The fellowship, made possible through a grant to the Institute by the Westinghouse Education Foundation, provides an award of $1,500 and tuition for three semesters of intensive education leading to a master of science degree in electrical engineering.

(Continued on page 34A)

Capture your audience from the first frame . . .

The new Kodascope *Pageant* Sound Projector

Sound movies are a potent tool for sales, training, and education—a wonderful entertainment medium. The Kodascope Pageant Sound Projector provides the realism in sight and sound that means convincing performances every time with 16mm. movies.

An improved optical system gives unusual projection brilliance. Pictures are sharp and clear from corner to corner. And the Pageant's unique audio system and "sound focusing" control assure clear, authentic tones at all volume levels.

Easy to thread and operate, the Kodascope Pageant, complete with speaker in a single case, weighs only 33 pounds. Rugged construction and permanent lubrication mean years of service. Price—$400. See it at your dealer's, or write for the free booklet, "The Kodascope Pageant Sound Projector." Eastman Kodak Company, Rochester 4, N. Y.

Price subject to change without notice. Consult your dealer.

FOR EDUCATION and ENTERTAINMENT

• Ideally suited for classroom or auditorium audio-visual instruction and entertainment • Ease of operation and ability to withstand abuse assure long, reliable life • Brilliant screen image and faultless sound reproduction mean no straining of eyes and ears. Also shows silent films, and has connection for microphone or record player.

MOTION PICTURES . . . teach, train, entertain

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Please send me ☐ your folder "The Kodascope Pageant Sound Projector"; ☐ arrange a showing of your special Kodascope Pageant Sound Projector demonstration film.

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CITY_____ ZONE_____

STATE_____

Don't let students chew nuts!

Instructors find that classroom equipment lasts longer when students use the Sargent Bernard Parallel-Action Plier. See for yourself how easy it is to get a tight grip on anything...

Put this SARGENT Tool to work...

It's a PLIER, a CUTTER and a WRENCH with the *NON-SLIP JAWS OF A VISE!*

EXTREME GRIPPING POWER is developed through dual fulcrum and cam lever construction...the co-operating parallel jaws taking hold like the jaws of a vise...with undiminished force throughout their entire length.

PROJECTING CUTTER BLADES easily cut wire where ordinary cutting pliers can not function...for instance, where wire is tight against a flat surface.

THE OPEN THROAT allows wire or any length of material to run through the parallel jaws from either end. It is often used for straightening lengths of wire.

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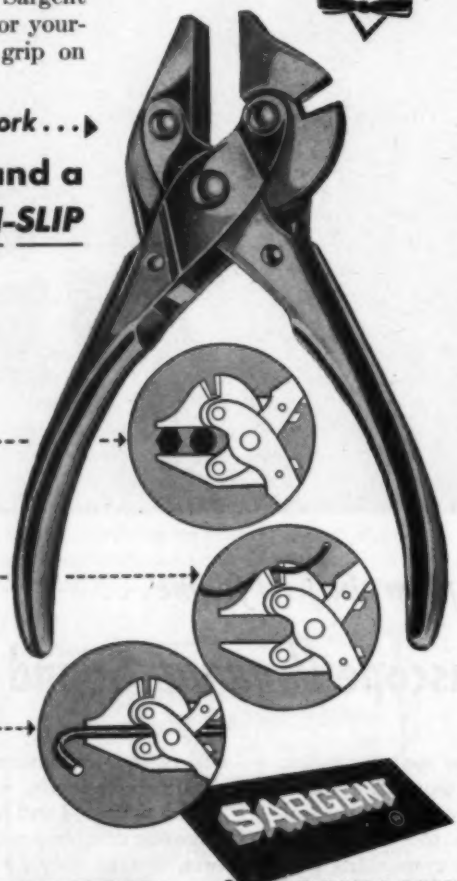

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PERSONAL NEWS

(Continued from page 32A)

♦ The following trade school principals have been appointed to the New York City School System: MICHAEL M. KATZOFF, Bronx Vocational High School; HARRY E. WOLFSON, Maxwell Vocational High School; STUART C. LUCEY to Grace Dodge Vocational High School; SIDNEY PLATT to Williamsburg Vocational High School; PHILIP BECKER to William Grady Vocational High School; JACOB H. RAPHAEL to Thomas A. Edison Vocational High School.

The new junior high school principals are: LOUIS BERNSTEIN, Junior High School 29, Brooklyn; MAURICE MEHLMAN, Junior High School 73, Brooklyn.

♦ E. W. MANZER taught a summer course in graphic arts and art metal at the Western Washington College of Education in June and July. He is head of the industrial-arts division of the State Teachers College, Platteville, Wis.

♦ ALAN R. PAWELEK has resigned his position at Ball State Teachers College, to accept the chairmanship of the industrial-arts department at Western Washington College of Education, Bellingham, Wash.

♦ WILLARD W. BEATTY, formerly chief of the educational program for the Bureau of Indian Affairs, Washington, D. C., has been appointed deputy director of the Department of Education in charge of fundamental education training centers for UNESCO.

♦ MAURICE D. KILBRIDGE, instructor in industrial engineering at Illinois Institute of Technology, has been promoted to assistant professor. The promotion was effective September 1.

Mr. Kilbridge was graduated from Fenwick High School in 1938, and attended Wright Junior College in 1939. He received a bachelor's degree in mathematics in 1943 from Loyola University.

In 1948 he received a master's degree in mathematics from Loyola, and a master of science degree in industrial engineering in 1951.

♦ ELI STERNBERG, associate professor of mechanics at Illinois Institute of Technology, has been promoted to professor. The promotion was effective September 1.

♦ GEORGE L. SMITH, instructor in commercial subjects at Madison, Ill., was elected to membership in the Phi Delta Kappa Fraternity Alpha Chapter, at the University of Indiana summer session.

♦ B. ALFRED COX, St. Louis machine-shop instructor, was elected to membership in the Omega Chapter of Phi Delta Kappa Fraternity at the University of Michigan summer session.

♦ EDWIN B. MCCONVILLE was elected executive vice-president of Skilsaw, Inc., manufacturers of portable power tools. PAUL WATTS was elected vice-president in charge of sales for the same firm, and RALPH B. BRUNDRETT was named treasurer.

♦ ANDREW EATON, a graduate of Northwestern State College, Natchitoches, La., and a major in vocational-industrial education, has been appointed assistant supervisor of trade and industrial education for Louisiana.

♦ S. W. JACKSON, a graduate of Northwestern State College, and a major in vocational-industrial education, has been appointed director of the Ouachita Valley Vocational School at West Monroe, La.

♦ FORD HAYS, a graduate of Northwestern State College, and a major in vocational-industrial education, has been appointed director of the Curriculum Laboratory for Trade and Industrial Education in Louisiana.

♦ PAUL D. COLLIER, chief of the Bureau of Youth Services, Connecticut State Department of Education, Hartford, Conn., was chairman; and CHARLES W. SYLVESTER, Assistant Superintendent for Vocational Education, Baltimore, vice-chairman of the Second National Commission on Life Adjustment Education.

♦ CHARLES PROCTOR has been appointed to teach vocational agriculture in Woodstock, Vt.

♦ MICHAEL MCKEON and HILMER S. NELSON have both completed 25 years of service as vocational-agriculture teachers in Massachusetts.

♦ H. K. LOGAN, former acting business manager at Tuskegee, has been appointed purchasing agent of that institution.

♦ CLAUDE HORST, formerly of the Milwaukee Vocational School, Milwaukee, Wis., has been employed as supervisor of the industrial-arts shop at the University of Washington, College of Education, Seattle, Wash.

♦ KENNETH S. MAGELSSEN has been employed to teach general metal shop in the Seattle public schools, Seattle, Wash.

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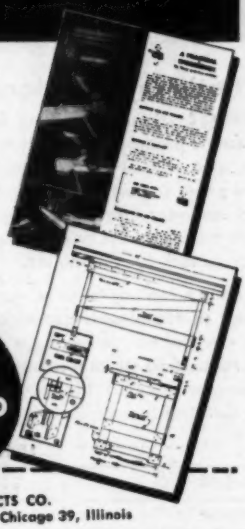

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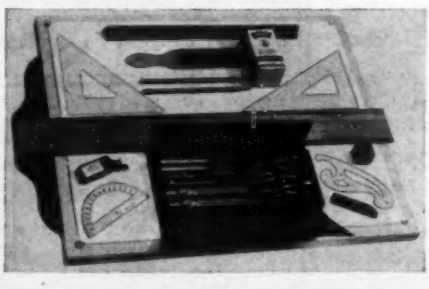

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Adjustable Top	24"	20"		
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Questions and Answers

ARTICLES ON INDUSTRIAL ARTS

1149. *Q.:* I am going to teach industrial arts for the coming year. This will be my first year to teach and I would like information and any suggestions which might be helpful to me in my first year of teaching. — *K. S.*

A.: Relative to your question on industrial-arts work it is quite difficult to determine just what you will need. The industrial-arts field is rather comprehensive. Are you starting out in a unit shop or in a general shop? If in a unit shop, what subject are you going to teach? Must you set up the program? What materials are you going to specialize in — wood, metal, plastics, ceramics, machine shop, foundry, sheet metal, electricity, auto mechanics, mechanical or architectural drawing, printing? Must you plan and lay out your own shop? Probably the best advice I can give you is that you visit some of the profs from your teacher training institution and discuss your problems with them. They will be very glad to assist you. Then, too, you can refer to articles* like the following which appeared in past issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

General Shop

Shop Check-In and Apron Problem, October, 1945, p. 377
A General Shop Report Card, January, 1946, p. 46
Industrial-Arts Equipment List — Comprehensive General Shop, May, 1946, p. 204
Progress and Grading Chart, June, 1946, p. 269
Laying Out the One-Teacher Industrial-Arts Department, March, 1948, p. 81
General Shop Personnel Organization, March, 1948, p. 119
Toward the Ideal General Shop, March, 1950, p. 104
Tool Panel Layouts, March, 1950, p. 113
Consolidated School Shop Plan, May, 1950, p. 195

Courses of Instruction

A Course in Plastics, January, 1947, p. 19
An Outline for Industrial-Arts Casting, March, 1948, p. 100
Revised Electrical Course for Junior-Senior High School, March, 1948, p. 112
Course in Plastics, March, 1948, p. 114
General-Shop Progress Chart, March, 1948, p. 129
Developing an Industrial-Arts Program for the Elementary School, September, 1948, p. 255
Course Building — An Overview, December, 1948, p. 392
A Course in Art Metalcraft, March, 1949, p. 118
Bench Metal Outline, March, 1949, p. 119
Plastics in the Industrial-Arts Shop, October, 1949, p. 316 and November, 1949, p. 351
Operation Units in Printing, December, 1949, p. 426
Seventh- or Eighth-Grade Course in Printing, March, 1951, p. 68A — *J. J. M.*

*Probably readers can look up this material in the library of their school superintendents, or in the high school library, where back copies of our magazine may be kept. We cannot supply copies of these articles because most of this material is out of print.

News Notes

♦ Association of Casualty and Surety Companies, 60 John St., New York 7, N. Y., reports that ten states have won the Association's Superior Awards for offering courses in driver education during the 1950–51 academic year in at least 50 per cent of their secondary schools, with not less than half of the eligible students enrolled. These states are Arizona, California, Illinois, Massachusetts, Michigan, Minnesota, New Jersey, North Dakota, Oklahoma, and Wisconsin.

♦ Starting this fall, a new *Junior Guidance Newsletter* for elementary school administrators, teachers, and counselors is being issued monthly by Science Research Associates, 57 West Grand Ave., Chicago 10, Ill. It carries news about the latest techniques and developments in elementary education, guidance, child study, and related fields.

♦ A new low-cost resorcin-phenol adhesive which meets military specification MIL-A-3784 (formerly JAN-A-397), has been developed by the Borden Company's Chemical Division.

The new adhesive is called Casophen LT-68, and is an improved modification of Casophen LT-67.

A big advantage of LT-68 over its predecessor is that it can be stored for a full year without sacrificing any of its working properties or the quality of the bond. LT-67 had a storage life of only six weeks.

(Continued on page 39A)

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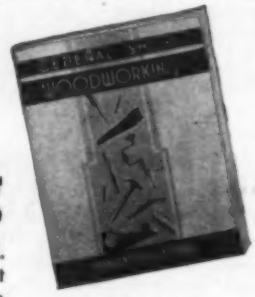

By FRYKLUND and LaBERGE. This book is written for text use in courses to teach the fundamentals of hand woodworking. Clear text instruction is made more understandable by many line drawings which explain and illustrate procedures. Provides information on sources, processing and uses of wood. Describes many types of woodworking occupations. Contents include layout, marking gauges, planing, squaring stock, sharpening edge tools, transferring designs, miter joints, moldings, stains, fillers, moisture in lumber, common woods, hardware, upholstering. Designs for 25 projects. $1.25. Send for approval copy. Clip this ad.

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- ☐ GENERAL PRINTING — Cleeton & Pitkin. For beginning students $1.80
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- ☐ PROBLEMS IN DRAFTING AND DESIGN — Goff. 50 problems for beginners and advanced students $1.00
- ☐ DRAWING APTITUDE TEST — Mitchell. Specimen set.....$ .35
- ☐ SPUR GEARING — Owen. Elements of gear design.....$1.00
- ☐ METALWORK, TECHNOLOGY & PRACTICE — Ludwig. Complete textbook $4.40
- ☐ GENERAL SHOP METALWORK — Dragoo & Reed. Basic text..$1.25
- ☐ UNITS IN SHEET METALWORK — Smith. First Course, short units $1.00
- ☐ UNITS IN BENCH METALWORK — Smith. Elementary bench work $1.00
- ☐ ETCHING, SPINNING, RAISING AND TOOLING METAL — Smith $1.25
- ☐ UNITS IN PATTERNMAKING & FOUNDING — Smith. First course. $1.00
- ☐ UNITS IN FORGING & WELDING — Smith $1.00
- ☐ GAS & A.C. ARC WELDING & CUTTING — Jennings. Elementary for use in school shop.....$1.25

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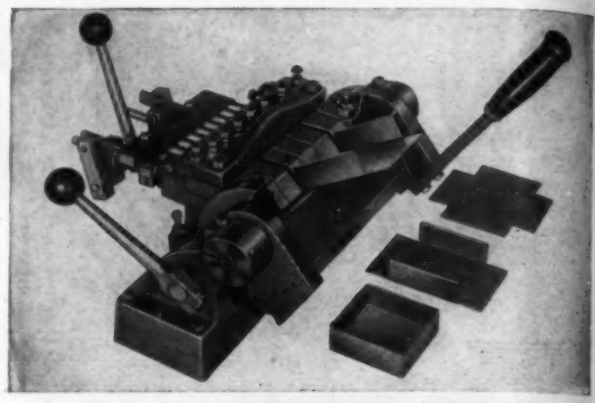

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NEWS NOTES

(Continued from page 36A)

The bond is completely resistant to boiling and outdoor exposures, and is used, among other things, in laminated frames, keels, and other ship parts, and for ribs for Arctic shelters, army field furniture, and skis.

♦ A new 68-page catalog is now ready for distribution by the Society for Visual Education, Inc., Chicago, and their dealers.

This new edition not only lists but describes in a compact manner and illustrates many of the 682 film strips, 416 Slidesets, 314 and 325 respectively are new and have never before been listed, and 2 by 2 color slides in the S.V.E. library. Ten pages are devoted to illustrations and descriptive information of all S.V.E. projection equipment and accessories.

Areas contained in the catalog are Literature and Language Arts, Social Studies, The Sciences, Mathematics, Health and Physical Education, Vocations, and Fine Arts.

Each film strip, Slideset, and slide grouping is preceded by short, concise statements outlining content and general utilization in reference to the curriculum. In many instances, additional information pertinent to complete understanding of the content has been provided immediately following the individual titles along with the number of frames and/or slides in a set.

Free copies of this catalog may be obtained from any S.V.E. dealer or by writing direct to the Society for Visual Education, Inc., Dept. EC, 1345 Diversey Parkway, Chicago 14, Ill.

♦ Aluminum Company of America is expanding its research facilities with the erection of a new building at the company's Aluminum Research Laboratories at New Kensington, Pa.

The new 80 by 170-ft. unit is needed to relieve congestion and to extend Alcoa's research facilities to meet increasing demands of the national defense program. The new addition will consist of two bays, one of which will be three stories high, the other two stories. A six-ton mill-type crane will be installed in the first bay to handle heavy research equipment.

♦ Reynolds Metals revises movie, "Pigs and Progress," a picture which shows aluminum production in full color. It has been revised to bring it up to date with the rapidly advancing uses for aluminum.

Prints of this picture on 16mm. film with sound track are available for loan without charge. To obtain bookings, write Motion Picture Department, *Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky.*

♦ A visible film strip record system for use by the film-strip librarian has been developed and released by Standard Projector and Equipment Company, Chicago, Ill.

The system is designed to provide the administration of a school or group of schools with a simple, easy-to-maintain set of records for maximum utilization of film strips.

It contains record sheets for keeping track of bookings or "charge-outs" for 360 different film strips. Space is provided for 22 entries for each film strip, or a total of 7920 bookings in all.

The system provides the audio-visual director, or other responsible person with the following information:

1. The number of requests for each film strip.
2. The number of times a request was not filled.
3. A record of film strips purchased, from whom and when.
4. A record of film strips previewed, by whom, with an evaluation.
5. The name of each film strip used by each teacher in the school.

For further information write to the *Standard Projector and Equipment Co., 205 W. Wacker Drive, Chicago 6, Ill.*

♦ Men in civil life, either veterans or non-veterans with a degree in civil engineering, geology, or photogrammetric engineering, can now enter the air force directly as officers, with a topographic engineer commission. To qualify for this commission one must have experience in these fields: engineering, surveying, cartography, topographic drafting, geodetic surveying, or other related fields. Experience in lithographic and reproduction work is also desirable. More specifically, an applicant must have technical knowledge of survey work, such as determining exact locations and measurements of points, elevation lines, areas and contours on the earth's surface; or, should be experienced in photogrammetric and cartographic draftsmanship; or, photographic laboratory methods, photo-transferring and lithographic processes, or the operation and maintenance of lithographic equipment.

Appointments will be made in grades from first lieutenant through lieutenant colonel, depending on age. Inquiries should be addressed to the *Department of Military Personnel Procure-*

(Continued on next page)

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NEWS NOTES

(Continued from previous page)

ment, Headquarters First Air Force, Mitchel Air Force Base, New York.

♦ Volume VIII, No. 1, "Hobart Arc Welding News," a 16-page booklet of interesting photographs and articles on welding from all over the country, is now available. Copies are mailed free of charge to anyone interested in arc welding.

Many of the articles feature time- and money-saving applications. To get your copy, write the Hobart Brothers Company, Troy, Ohio.

♦ Representatives of 22 United States industrial firms will acquire specialized training in nuclear engineering at the Oak Ridge School of Reactor Technology during the 1951–52 term beginning in September.

Of a total of 75 students who will attend the 12-month term, 24 candidates are sponsored by the industrial firms and 8 by government agencies. The remaining 43 are recent college graduates selected primarily on the basis of their potential contribution to reactor development phases of the national atomic energy program.

♦ The Rubber Manufacturers Association, Inc., and the Multiple V-Belt Drive & Mechanical Power Transmission Association today announced the publication of a 16-page manual of recommended "Engineering Standards for Multiple V-Belt Drives," as developed and approved by the technical committees of both associations.

The "Associations" expect that the new standards manual will be of material assistance to the thousands of users of Multiple V-Belt Drives. The data in the manual is based on the latest engineering opinion and research. The manual indicates the proper sheaves and belts to be used for the attainment of optimum efficiency and economy of the complete drive in relation to the particular duty required.

The standards may be obtained at a cost of $1 for two copies from either the *Multiple V-Belt Drive Association, 7 West Madison Street, Chicago 2, Ill.*, or *The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y.*

Aluminum Company of America, Motion Picture-Educational Service Department, 818 Gulf Building, Pittsburgh 19, Pa., have sound motion pictures, visual aids, and booklets for school use. ALCOA LIBRARY, listing series of general interest films, how-to-do-it series, matching booklets and charts sent on request. Address as shown above.

♦ Kansas State College, Manhattan, Kans., will offer work leading to the doctor of philosophy degree in agronomy and in applied mechanics beginning June 1. The State Board of Regents approved the two new graduate programs at its regular March meeting.

With the regents' action K State becomes the only institution of higher learning in a five-state area offering work leading to the Ph.D. degree in engineering other than one in chemical engineering offered by Oklahoma A. and M.

♦ State directors of vocational education were called to meet with officials of the U. S. Office of Education at Washington, on April 23, to discuss the use of defense training funds when these are ready to be released.

♦ More than 50 industrial education and vocational teachers from throughout the United States took part, as teachers and students, in a two-week mechanical drawing workshop at Bradley University.

The workshop was in session from July 2 to 11. Talks, panel discussions, demonstrations, and on-the-job visits were included in the sessions.

Directing the workshop was William Bettencourt, head of the mechanical drawing department of the Belmont, Mass., high school.

Others who were teaching at the workshop included Rex Waymack, Notre Dame; Dr. Stanley Pawelek, supervisor of industrial education, Baltimore; Paul A. Barre, Eastman Kodak Co.; Justus Rising, Purdue University; R. P. Hoelscher, University of Illinois; Paul Grable, Caterpillar Tractor Co.; George Higbee, University of Iowa; H. C. Spender, Illinois Institute of Technology; and Carl S. Barber, Rockford public schools.

Three on-the-job trips were included in the program: one to Lankton and Ziegele; another to Caterpillar's drafting department; and the third to the site of Bradley's new men's dormitory, now under construction.

Bradley instructors taking part in the workshop included Glendon Arvin, Edward J. Schlegl, Harry R. Brill, and Fred Strickler.

♦ A new color motion picture with sound has been produced by DeWalt Inc., Lancaster, Pa., manufacturers of cutting machines for the woodworking, metal, and plastics industries. The new film, five minutes in length, shows the many applications of the latest line of DeWalt machines.

(Continued on page 42A)

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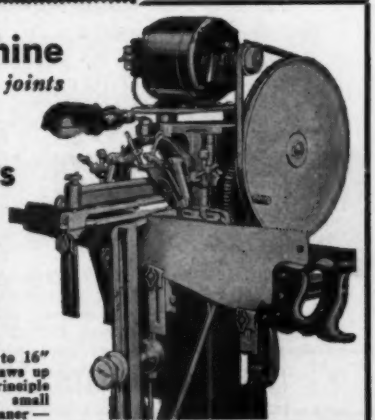

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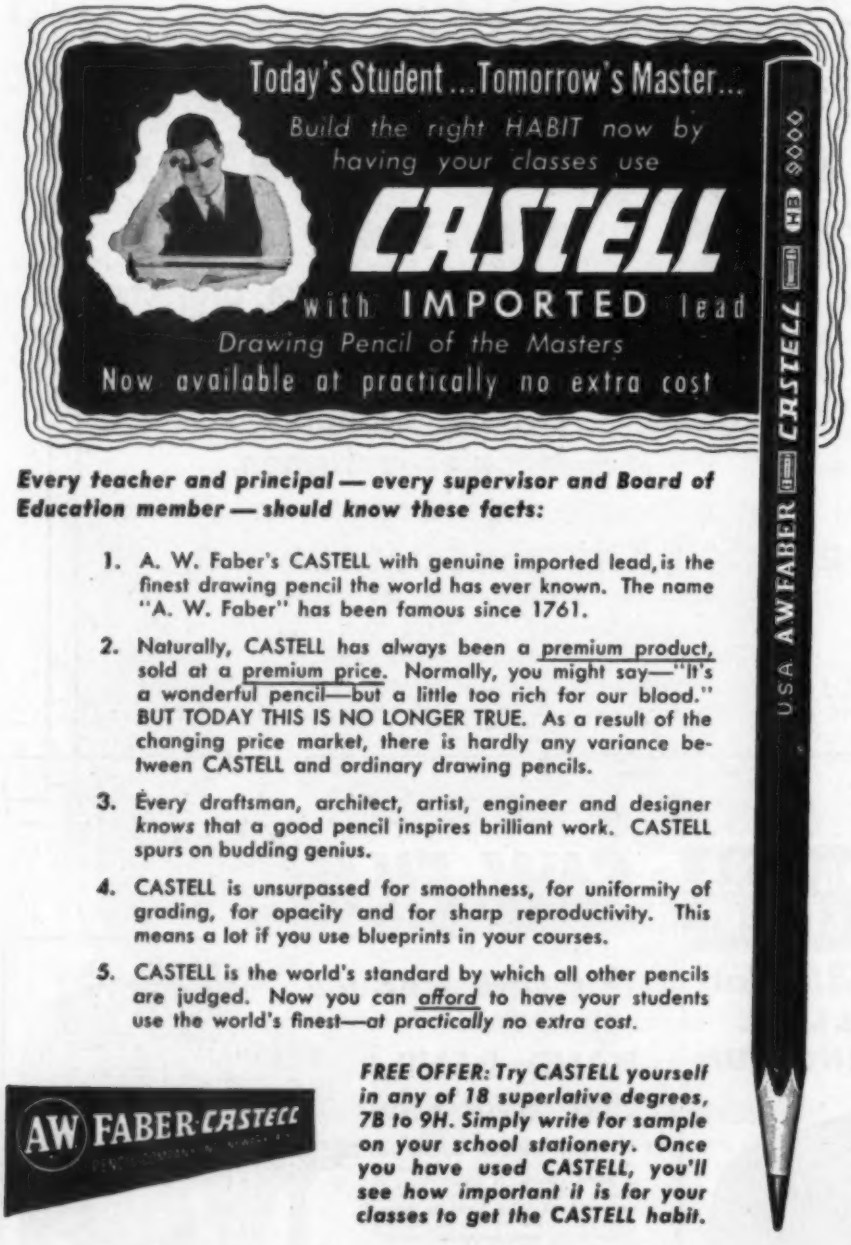
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NEWS NOTES

(Continued from page 40A)

the DeWalt Models '400'. The machine is shown as a power feed: ripsaw, single-head shaper, single-head molder, rabbeting machine, tongue and grooving machine, bevel-rip machine, and ploughing machine. The motion picture is an educational demonstration of the safety, accuracy, and speed of the DeWalt '400' line. The film, the first of six DeWalt demonstrations films proposed for release this year, is now available for free distribution to industrial plants, schools, lumber yards, home builders, etc., through DeWalt representatives located throughout the country. For more information about the latest DeWalt demonstration film, write to: DeWalt Inc., Dept. P-113, Lancaster, Pa.

♦ A new 4-page folder titled "Just What Tolerances Can That Machine Meet" is available from V. W. Palen, Bureau of Public Information, New York University College of Engineering, New York 53, N. Y. Enclose 10 cents to cover cost of handling and mailing.

The text material was prepared by Frank M. Gryna, Jr., Department of Industrial and Management Engineering. The folder tells how to determine scientifically whether or not a machine can meet a certain tolerance.

By means of a typical example, the author demonstrates six steps by which the quality control engineer gets the machine in statistical control. He then works out the mathematical problem and finds the answer.

♦ "The Miracle of Rubber," a two-reel sound and color film produced by the March of Time, is available for free loan to schools, industries, churches, and other community organizations from Association Films, Inc.

The film shows the many uses of rubber in manufacturing, farming, transportation, and in the home. It also shows the tremendous factories where rubber is manufactured, the colorful rubber plantations in Liberia — Africa's only republic, and the fascinating laboratories where new processes and products are born.

"The Miracle of Rubber," sponsored by the Firestone Tire & Rubber Company, may be borrowed at no charge except transportation from any of the four Association Films' offices in: New York, 35 West 45th St.; Chicago, 79 E. Adams St.; Dallas, 1915 Live Oak St.; and San Francisco, 351 Turk St.

♦ Almanac Films, Inc., 516 Fifth Avenue, New York City, announces its new 1951 Catalog of educational films. The catalog lists the new program of "Kieran Kaleidoscope" films on nature and science, as well as subjects in music and art.

Copies of the Catalog may be had, free of charge, by writing to the company.

♦ Two new fellowships in metallurgical engineering have been established at Illinois Institute of Technology by the International Nickel Company, Inc.

Each of the fellowships provides for two years' study leading to a master of science degree in metallurgical engineering, and carries an annual award of $1,500 and tuition.

Purpose of the program, to begin in September, 1951, is to stimulate work in the fields of nickel, copper, and the platinum metals.

A course of study will provide both practical and theoretical education. A specified research project will be determined by officials of the Institute and the sponsoring company.

Candidates must have a bachelor's degree in metallurgical engineering from an accredited engineering college. The awards will be based on personal qualifications, interest, and scholarship.

For further information write to Dr. William A. Lewis, dean of the Institute Graduate School, Illinois Institute of Technology, Chicago 16, Ill.

♦ David L. Arm, dean of the School of Engineering at the University of Delaware, is the first selectee to be brought into the Du Pont Company under its new program for providing engineering college educators with a year's experience in industry.

This new program is designed to help bridge the gap between the campus and industry. Du Pont is giving several educators from engineering schools 12 months' experience throughout its entire engineering organization. Additional appointments are expected to be announced within the next two months.

Their regular salaries, plus reasonable expenses, will be paid by Du Pont. It is hoped by providing colleges with insight into the viewpoints and problems of industry, engineering students may be better prepared to cope with the complexities of modern day industrial engineering.

David L. Arm has been dean of the School of Engineering at the University of Delaware since July 1, 1946. Prior to this he had been head of the mechanical engineering department at Iowa State College.

(Continued on page 44A)

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NEWS NOTES

(Continued from page 42A)

♦ The Arkansas Vocational Agriculture Service has arranged intensive workshops in rural electrification for 300 vocational agriculture teachers next summer.

Outlines for the course will be co-operatively prepared by the state vocational agricultural staff, the department of vocational agricultural engineering and teacher training, and the Arkansas Power and Light Company.

♦ The Wisconsin State Council, United Brotherhood of Carpenters and Joiners of America, have set up a $500 one-year carpenter apprentice scholarship to which the Wisconsin Chapter of Associated Contractors of America have recently added a $100 one-year incentive award.

The winner is selected on the basis of a competitive examination, and the course is given at The Stout Institute, Menomonie, Wis.

♦ General Motors Institute in Flint, Mich., is again offering an auto-mechanics teacher-training program for instructors. There will be two classes of four weeks each beginning June 25 and July 23 respectively.

For further information write to General Motors Institute, Flint, Mich.

♦ Three hundred friends and associates attended a recognition dinner in honor of Carl T. Cotter, director of vocational and industrial arts education in the Toledo, Ohio, public schools, at Macomber Vocational High School in that city on the evening of April 14, 1951.

Mr. Cotter, who was named director in 1909, will retire at the end of the current school year. His service adds up to the longest continuous directorship in the Toledo schools' history.

Speakers at the recognition dinner included E. L. Bowsher, superintendent of schools; Edward C. Ames, member of the board of education; and Ralph Howard, state director of vocational education.

Mr. Cotter was presented with a television set and a bound collection of congratulatory letters.

A native of Toledo and a product of that city's public schools, Mr. Cotter was graduated from the University of Michigan in 1904. He was a drafting instructor in the old Toledo Manual Training School and instructor and director of the Hackley Manual Training School, Muskegon, Mich., before his appointment to the Toledo post.

A TREASURY OF TYPE

Essays and excerpts from memoirs, letters, and poems will feature *Books and Printing: A Treasury for Typophiles*, which the World Publishing Company will issue next December. The book will be edited with an introduction and notes by Paul A. Bennett, an international authority on typography. It is unique in that more than 10 different type faces will be used, making the volume a type specimen book as well as entertaining reading.

The first trees as we know them, with more-or-less solid wood and needle-like leaves, appeared in the Permian Age 235 million years ago. — *National Lumber Manufacturers Association.*

Almost 60 million tons of steel, in the form of pipe lines, lie buried in the soil of the United States today, transporting oil, gas, and products to the American people. — *Petroleum Newsnotes.*

New Publications

Occupational Outlook Handbook

Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Paper cover, 575 pp., 7¾ by 10¼ in., illus., $1.

A new edition of the *Occupational Outlook Handbook* has just been prepared by the U. S. Department of Labor's Bureau of Labor Statistics, in co-operation with the Veterans Administration.

The handbook contains complete employment information on 433 occupations by which Americans earn their living. It will be used by VA in counseling disabled veterans planning vocational training. It also has been adopted for official use by all other federal agencies providing counseling services. High schools, colleges, and community guidance services are expected to use it widely.

Automatic Transmissions — Principles and Maintenance

By Ray F. Kuns. Cloth, 466 pp., 6¼ by 9¼ in., illus., $4. The Bruce Publishing Co., 400 No. Broadway, Milwaukee 1, Wis.

(Continued on page 46A)

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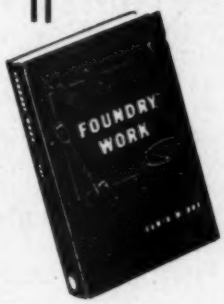

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NEW PUBLICATIONS

(Continued from page 44A)

This book will be welcomed by students as well as by mechanics, servicemen, and others who are interested in automotive transmissions which are found in ever increasing numbers on present-day automobiles.

The author, who is a well-known authority in the field of auto mechanics, describes in this book how automatic drive operates, how the various types are designed, how they are serviced, and how they may be tested.

The book carries excellent descriptions of the Buick Dynaflow, Chevrolet, Power-Glide Torque converter, Chrysler Gyrol Fluid Drive, Ford-Mercury Automatic Transmission, Oldsmobile Hydra-Matic Drive, Packard Ultramatic Drive, and Studebaker Automatic transmission.

Your Jewelry

By J. Leslie Auld. Cloth, 121 pp., 5 by 7½ in., illus., $2.75. Chas. A. Bennett Co., Inc., Publishers, Peoria, Ill.

A compact little volume on the art of jewelry making. It contains many pages of line drawings to illustrate how to make some of the tools used by the jeweler. Then there are chapters explaining how to anneal, clean and pickle, file and saw, solder, work with wire, and make decorative units and chains. It also describes how to do repoussé work, engrave, set stones, make joints and catches, and do finishing, polishing, and coloring.

Make Your Own Modern Furniture

By Norman Cherner. Cloth, 140 pp., 6¼ by 10 in., illus., $4. McGraw-Hill Book Co., Inc., New York, N. Y.

An interesting book presenting suggested interior arrangements for a one-room apartment, a living room, a bedroom, a dining room, and a child's room.

There are 24 plates which show how some of the pieces of furniture are made.

The book also contains a chapter on finishing and on upholstering.

Architectural Graphic Standards

By Charles George Ramsey and Harold Reeve Sleeper. Cloth, 614 pp., 9¾ by 11¾ in., illus., $10. John Wiley & Sons, Inc., New York 16, N. Y.

This is the fourth edition of this encyclopedic book on architectural graphic standards. This edition might almost be called a new book because it has been largely rewritten, and 308 new plates have been added.

This fourth edition contains thousands of items on the various things that go into a building. The data and illustrations presenting this building information have been arranged in the sequence in which the material is used in erecting a building. Starting with the foundation, excavating, laying out the foundations, and the erection of the basement is graphically shown. Then follow in succession all of the different items that go into the erection of the building.

The book was specially designed for architects, builders, draftsmen, civil engineers, building superintendents, and maintenance men. The presenting of much of this information in graphic standards is especially valuable.

Vocational Guidance Manuals

The following volumes together with others that appeared earlier present much concrete information for the beginner who is trying to decide on the vocation he is to enter.

The price of these volumes is $1 apiece. They are bound in paper and are uniform in size—5⅜ by 7⅜ in.

They are published by Vocational Guidance Manuals, Inc., 45 West 45 Street, New York 19, N. Y.

Opportunities in: *Atomic Energy*, 144 pages; *Printing Trades*, 112 pages; *Motor Transportation*, 112 pages; *Interior Decoration*, 106 pages; *Free-Lance Writing*, 106 pages; *Architecture*, 112 pages; *Acting*, 128 pages; *Fashion*, 112 pages.

Occupational Choice: An Approach to a General Theory

By Eli Ginzberg, Sol W. Ginsburg, Sidney Axelrad, and John L. Herma. Cloth, 271 pp., 6¼ by 9¼ in., $3.75. Columbia University Press, New York 27, N. Y.

This is a study of the determinants of occupational choice which was jointly made by the authors over a period of several years.

In analyzing the basic process of decision making, the period of tentative choices, realistic choices, and choice patterns in general were studied. Then a study of significant groups—upper income and lower income groups—was made, after which a general theory of occupational choice was worked out.

The book contains quite a large bibliography.

Simplified Mechanics and Strength of Materials

By Harry Parker. Cloth, 275 pp., 5¾ by 8 in.,

(Continued on page 54A)

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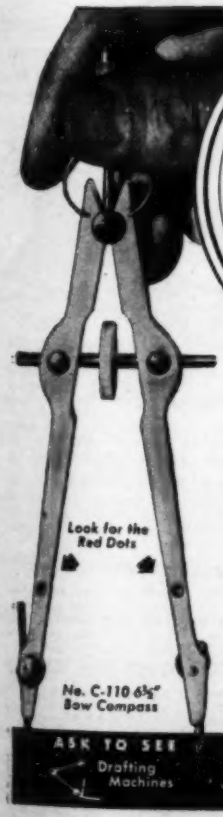

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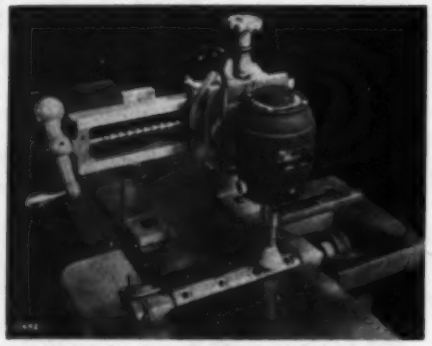
SHOP EQUIPMENT NEWS

KNIFE GRINDING ATTACHMENT FOR THE DELTA 8-IN. JOINTER

The Delta Power Tool Division of the Rockwell Manufacturing Company announces a new knife grinding attachment for the Delta 8 in. Jointer. This device makes it possible to resharpen blades without removing the cutterhead from the machine.



Delta knife grinding attachment sharpening knives of an 8" jointer

To facilitate installation, the Delta 8 in. Jointer is furnished with table drilled and tapped to receive the attachment. Proper grinding angle can be obtained by placing a pin through the stop bar into the end of the head. A star wheel accurately adjusts the grinding wheel to any desired position, and a ball crank handle guides it across the knives evenly and without vibration.

Further information regarding this machine and its attachments may be obtained by writing to the *Delta Power Tool Division of the Rockwell Manufacturing Co., 600 East Vienna Avenue, Milwaukee, Wis.*

For brief reference use IAVE—0801.

NEW PORTER-CABLE GUILD SANDER NO. 106

Porter-Cable's newest Guild Sander, Model 106, is powered by a heavy duty Universal motor. The sander's simple, gearless design eliminates costly servicing problems common to more intricate sanders.

New Porter-Cable Guild Sander

Homeowners will find that this tool saves hours of tiresome hand labor involved in such jobs as fitting screens, sash and doors, patching plaster, refinishing furniture.

Schools, too, will welcome this new sander because it is not only economical and safe for training and project work in school shops, but also because it has more than enough rugged power and dependability for year-round use on school maintenance jobs such as resurfacing desks, chairs, and blackboards.

The abrasive pad of the Model 106 sander revolves in a ¼-in. diameter orbit at 4000 r.p.m. The thousands of abrasive grits, traveling in tiny, overlapping circles, produce a uniform smoothing action. Because of this orbital motion, the machine can sand with, against, and across the grain without scratch or mar. This blending action is particularly effective wherever cross grains meet — at butt, miter, and glued joints, for example.

The Model 106 uses ⅓ of a standard 9 by 11-in. sheet of sandpaper which is quickly drawn into place and secured with a patented paper clamp. The large air intake, located high on the machine, draws in sufficient quantities of air to keep the motor cool.

For further information write to *Porter-Cable Machine Co., Dept. PR-1, Syracuse, N. Y.*

For brief reference use IAVE—0802.

STANLEY DEFIANCE "PULL-PUSH" RULE

Stanley tools now offers a new Defiance "Pull-Push" flexible steel rule in 6 ft. (No. 1206W), 8 ft. (No. 1208W), and 10 ft. (No. 1210W) lengths. White enamel is baked on the face of the nickel-plated blade for extra wearing quality. The ½-in. blade has large, black, easy-to-read numerals. It

Stanley Defiance "Pull-Push" Rule

is rigid for measuring straight surfaces, flexible for circular and for angular forms.

The chrome-plated *D* shaped case can be used for inside measuring by adding two inches to the measurement on the blade. The blade is replaceable.

For further information address *Stanley Tools, New Britain, Conn.*

For brief reference use IAVE—0803.

THE DI-ACRO QUIK-LOK CLAMP

The Di-Acro Quik-Lok Clamp is available for all No. 2 and No. 3 Di-Acro Benders now in use and it can be readily mounted by merely bolting it onto the Bender Base as illustrated in the picture showing an operator on a Di-Arco Bender No. 2.

(Continued on page 50A)

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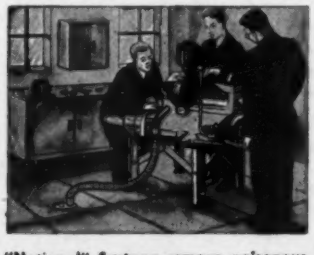
SCHOOL SHOPS REQUIRE THE REMOVAL OF POISONOUS GASSES



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"National" Systems remove poisonous carbon monoxide gas at the source without heat loss. Pupils in school shops are free from the danger of deadly fumes. Easily installed in new or existing buildings. No rearrangement of present shop layout necessary.

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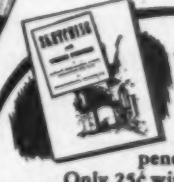

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SHOP EQUIPMENT NEWS

(Continued from page 48A)

It is ideal for use when bending tubing, angle, channel, and extrusions as it securely locks these materials during the forming operation thereby assuring a perfect bend and its wide opening jaws allow easy removal of the formed part.

The Di-Acro Quick-Lok clamp

Complete information covering this product and also a complete new line of tube bending accessories for all Di-Acro Benders is contained in a new Di-Acro Bending Manual entitled "It's Easy to Bend" which is available without charge to our readers.

For further information write to *O'Neil-Irwin Mfg. Co., 351 Eighth Ave., Lake City, Minn.*

For brief reference use IAVE—0804.

NEW CROWN LEATHER CATALOG

A 16-page catalog has just been published by the Crown Leather Company. It gives information on leather, leathercraft tools, ornaments, and supplies.

For a copy write to the *Crown Leather Co., 22 Spruce St., New York 38, N. Y.*

For brief reference use IAVE—0805.

DUMORE DRILL GRINDER

A new drill grinder for 2-lip twist drills, from No. 70 to ¼ in., either straight or tapered shank, is announced by The Dumore Company.

This new tool offers the small drill user very interesting economies in increased hole production, lower drill costs, reduction of scrap loss, and improved hole finish and tolerance. Its speed, accuracy, rugged construction, and simplicity of operation mean that even untrained help can grind drills right, the first time, freeing foremen and trained operators for more productive work. The machine is so fast that sharpening for an entire shop or department often can be handled by a tool crib apprentice.

Powered by ⅛-h.p., 115-volt Dumore motor (230V can be supplied), the drill grinder swings a 2 by ⅜ by ¼-in. wheel for sharpening. An identical wheel is mounted on the other end of the motor armature shaft for rough grinding broken drills to shape, together with a thinner

(Continued on next page)

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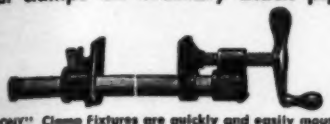

"PONY" Clamp Fixtures are quickly and easily mounted on any length of ordinary black pipe to make fast-operating, sure-holding bar clamps of any length — any time! No tools required to assemble — just the regular pipe threads. Built to take the rigors of school-shop and industrial service. Style #50 (for ¾" pipe) is "standard" in school shops everywhere — other Styles are available too!

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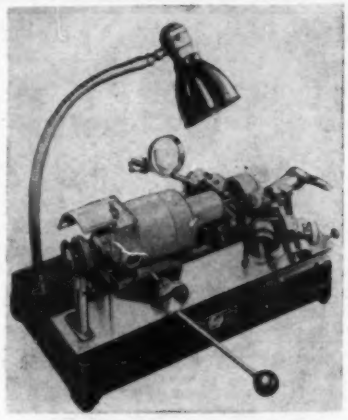


New Dumore drill grinder

wheel for web thinning. Standard equipment includes 1¼-in. collet, chuck extension drill holder for No. 52 — 70 drills, diamond wheel dresser, and setup gauge.

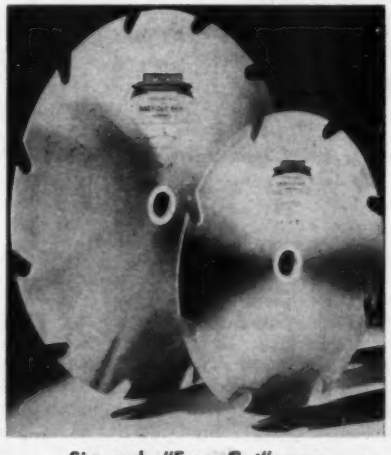
For further information write to *The Dumore Company, Racine, Wis.*

For brief reference use IAVE—0806.

SIMONDS ANNOUNCES "EASY-CUT" SAW

Simonds "Easy-Cut" saws are now available through leading supply houses.

This new saw with its novel tooth design is based upon an entirely different conception of wood sawing. Because the new design has relatively few teeth and each tooth takes a limited



Simonds "Easy-Cut" saw

"bite" it minimizes kickback and "grabbing" action, and requires less power, and is quieter in operation. It is best suited for ripping, but it also can be used for rough cutoff and combination work on either table type or radial arm machines. Simonds "Easy-Cut" saws are made from 6 to 16 in. in diameter with 8 or 12 teeth to the saw, either solid tooth or carbide tipped.

Solid tooth "Easy-Cut" saws are for hand feed only. Carbide tipped "Easy-Cut" saws are recommended for either hand or power feed.

Descriptive folder with complete specifications and recommendations can be obtained from *Simonds Saw and Steel Co., Fitchburg, Mass.*

For brief reference use IAVE—0807.

(Continued on next page)

LISBETH SCHAEFFLER

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Photo courtesy of Lisbeth Schaeffler, New Rochelle, N. Y.

Shown above is Miss Lisbeth Schaeffler of New Rochelle, N. Y., unloading beautifully hand-made ware from her Harper Electric Studio Kiln, SK-151416. In a recent letter, Miss Schaeffler who purchased her kiln 5 years ago says: "I can't say enough for the performance of my Harper Kiln. I have fired it on the average of once a week since I bought it in 1946 and this is the first time I have had to replace the elements."

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SHOP EQUIPMENT NEWS

(Continued from previous page)

LYON PORTABLE TOOL STAND NO. 3107

This Lyon Tool Stand is very handy around production machines, for storing small tools, and as parts containers for assembly lines. It is available in either the stationary or portable models.

Lyon's portable tool stand No. 3107

Intermediate trays are all interchangeable and punched for attachment of drawers. The drawer has a padlock attachment and a sliding tool tray. The drawer operates on ball bearing rollers.

The Lyon Tool Stand with casters is 37⅛ in. high. Trays measure 20 by 28 in., and 24 by 36 in.

For further information address *Lyon Metal Products, Inc., Aurora, Ill.*

For brief reference use IAVE—0808.

NEW DEWALT '400' LINE

DeWalt, Inc., has introduced the Model GE '400' and GR '400' to its line of power feed machinery. Both models incorporate ideas that meet the demands of today's market — i.e., they permit builders, lumberyards, and others to produce hard-to-get finished materials such as finished flooring, window stripping, molding, etc., on the power feed machine.

The Model GE '400' (picture shown) is a standard DeWalt Model GE Radial Arm Machine that features a DeWalt Deluxe Safety Power Feed unit — Safety Power Feed and Custom Table Top.

The Custom Table of the DeWalt Models '400' has a pressure arm, a spring hold-in and a spring tensioned holddown. The Custom Table Top permits the operator to run molding, shape, rip, tongue and groove, rabbet and plough on the power feed machine. Each of the power feed operations can be run continuously and without fear of material being scarred or chipped by the cutter head, because the material is always held against the cutting tool by a constant pressure.

The DeWalt Safety Power Feed unit can be easily swung out of position when not required. That means that the DeWalt Models '400' can be used for cross-cutting, mitering, cross-dadoing and sanding and all the other standard operations possible on a standard DeWalt machine.

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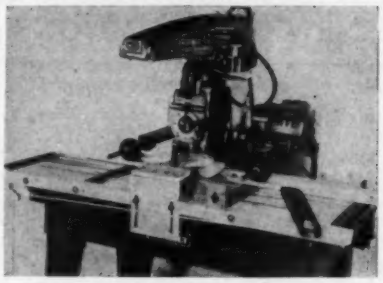

Model GE 400 radial arm machine

This firm also has released a new illustrated Tools and Attachments catalog for immediate distribution. The catalog includes all the DeWalt Tools and Attachments presently available for its entire line, which includes 39 models.

About 10 per cent of the material in the new catalog are DeWalt Tools and Attachments that have been added since the release of the last DeWalt Tools and Attachments catalog. A jig saw, lathe, belt sander, Custom Table Top and Safety Saw Blade are among the items featured in the new catalog.

For a free copy, write to *DeWalt, Inc., Dept. P-113, Lancaster, Pa.*

For brief reference use IAVE—0809.

BOOKLET ON THE FLEXIBLE SHOP

The Flexible Shop by David G. Girard and Frank L. Vail, is a booklet presenting the author's concept in school shop planning and power tool use. They have examined the flexible shop in relation to the woodworking area of industrial arts. Basis of the idea is the use of multipurpose equipment to relieve common shop problems and open the way for new teaching techniques. Among the subjects covered are teaching technique, machine change over, tool and equipment storage, cost analysis, shop layout, and special problems of small schools.

Write for a free copy of the booklet to *Magna Engineering Corp., 417 Montgomery St., San Francisco 4, Calif.*

For brief reference use IAVE—0810.

NEW BOICE-CRANE CATALOG

A new 48-page catalog, on power tools for cutting, shaping, drilling, and finishing wood, metal, fiber, and plastics, has just been produced by Boice-Crane Company.

Illustrated and fully described are jointers, planers, band saws, contour saws, drill presses, band filers, grinders, jig saws, lathes, belt sanders, spindle sanders, shapers, tilting-arbor saws, and saw jointers.

Get your free copy by addressing *Boice-Crane Co., 974 Central Ave., Toledo 6, Ohio.*

For brief reference use IAVE—0811.

MAGNA ENGINEERING CORPORATION MOVING

Magna Engineering Corporation, manufacturer of the Shop Smith, have moved their offices to a new location and can be reached after September 1, 1951, by addressing all correspondence to Menlo Park, Calif.

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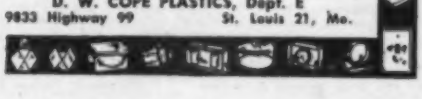

NEW PUBLICATIONS

(Continued from page 46A)

illus., $4. John Wiley & Sons, Inc., New York City.

This text presents the information on mechanics and strength of materials in a clear simple manner for students, artisans, and men who want to refresh their knowledge of this subject so necessary to the engineer and the designer.

A good working knowledge of arithmetic and algebra is sufficient for understanding the many examples and problems presented in this book.

How to Paint With Brush and Spray

Edited by Sam Brown. Cloth, 160 pp., 6¼ by 9½ in., illus., $2.50. Popular Mechanics Press, Chicago 11, Ill.

An informative book which will assist anyone interested in this type of work to get a good grasp of the many jobs in this field that the home craftsman may tackle.

The book contains seven chapters in which are treated the finishing of furniture; the painting of walls, floors, woodwork, and concrete floors; spray painting; the application of novelty finishes; metal finishing; and the painting of figurines and plaques.

The book is nicely illustrated and the directions are given in plain understandable language.

Machine Drawing

By Deane Lent. Cloth, 523 pp., 6⅛ by 9¼ in., illus., plus two large working drawings, $5.85. Prentice-Hall, Inc., New York 11, N. Y.

The author, before writing this book, contacted industry to discover what it expects of the beginner who comes into their drafting rooms after having finished an engineering course.

He discovered that industry desires the beginners to be up on their drafting techniques. Then they expect even the beginner to have some idea of design, and an understanding of how a machine part is designed and how it is produced in the shop.

The author has tried to make his book take care of these conditions and has divided his book into three parts — the design phase, the detail phase, and the assembly phase. The book attempts in this way to give the young draftsman the knowledge which industry is anxious to have its beginning draftsmen possess.

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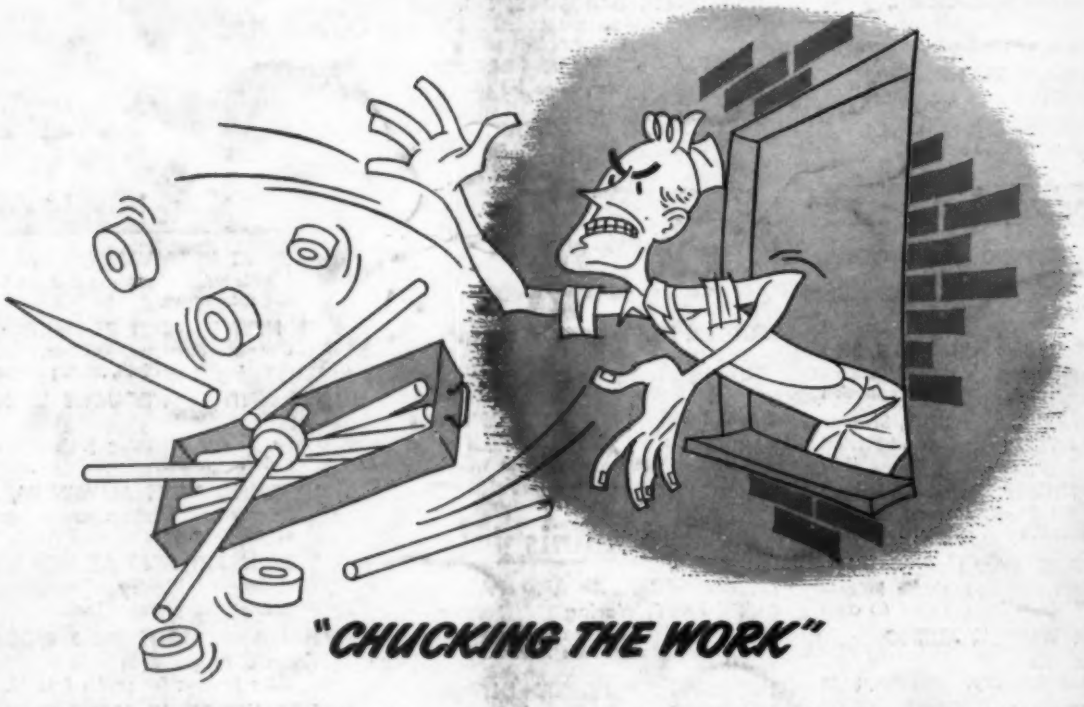

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